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IS THE NAVY STOCK FUND CONCEPT FEASIBLE FOR
MANAGEMENT OF INVENTORY SPARES ONBOARD
NAVAL AIRCRAFT CARRIERS?

John G Morris

IS THE NAVY STOCK FUND CONCEPT FEASIBLE FOR MANAGEMENT
OF INVENTORY SPARES ONBOARD NAVAL AIRCRAFT CARRIERS?

By

John G. Morris
Lieutenant Commander, Supply Corps, USN

Bachelor of Science

Kansas State Teachers College, 1963

A Thesis Submitted to the School of Government and
Business Administration of The George Washington
University in Partial Fulfillment of the
Requirements for the Degree of
Master of Business Administration

May, 1972

Thesis directed by

Frederick C. Kurtz, MBA

Associate Professor of Accounting

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CHAPTER I

INTRODUCTION

The technological revolution which has occurred in the United States in the past quarter-century has resulted in many changes in the environment, both social and economic. The period following World War II has presented many rewards from peacetime pursuits and, unfortunately for mankind, provided the United States and its enemies with powerful, destructive tools for the conduct of warfare. Along with the advantages offered by this phenomenal growth, there have arisen many challenges to management, both in the private economy and in the military community.

A major challenge posed to the military manager is that of providing logistical support, both maintenance and supply, for the sophisticated weapon systems of today and the future. Navy logistics managers have special problems in supporting new weapons, new communication control, and ships' propulsion systems. The systems to be supported in the seventies represent a "quantum jump" in complexity, performance, and cost over their counterparts of World War II. Today's demand for product variation dictates more than ever that an activity's inventory policy be wisely chosen. Such policies can make a real difference in the ability to

provide expeditious fulfillment of the requirements of supported units while minimizing the expense of maintaining an adequate inventory. Just as the old adage attests, "for want of a nail, a shoe is lost," the lack of a ten-cent transistor can deprive an expensive aircraft of its primary mission capability, and the nation is thus deprived of a portion of its deterrent force.

Of primary importance in the support of these complex weapon systems is the management functions performed by the supply officer on board the nation's largest men-of-war, the attack aircraft carriers. Operating with limited funds and inexperienced, overworked personnel, he is faced with the management task of procuring, receiving, storing, and issuing the food, clothing, consumables, and repair parts required to support the ship, an embarked air wing of approximately eighty-five combat aircraft, and the more than 5,000 persons required to operate and maintain the ship and aircraft. The aircraft support alone may encompass an inventory of spare parts of 88,000 line items with a combined dollar value of \$24 million.¹

Although this inventory of aeronautical repair parts has increased in size by approximately 300 per cent in the past fifteen years, the stocking objectives and inventory

¹CDR M. S. Ribble, SC, USN, Director, Allowance Control Division, Aviation Supply Office, presentation to the 25th Annual Aviation Supply Officers' Conference, Philadelphia, Pennsylvania, on October 20, 1970.

management concepts are basically unchanged from those utilized in the mid-fifties. An additional problem is that even though the cost of repair parts required to support these ships and aircraft has risen sharply over the past decade, funds budgeted by Congress for support of these inventories have been reduced substantially in the last few years.¹

It is the hypothesis of this writer that the present method of management and accounting for this ever-increasing inventory has become obsolete and too burdensome for effective management. It has reached the point, emphasized by Peter Drucker, that "a poor system structure makes a good performance impossible, no matter how good the individual manager may be. To improve the system structure . . . will therefore always improve performance."²

The major problem would appear to be that the carrier supply officer is asked to manage an immense inventory of repair parts which will not be required during the life cycle of the aircraft, let alone during a six- to nine-month cruise. This problem, combined with the problems of insufficient, overcrowded storerooms and shortage of qualified personnel, gives some indication of the difficult, if not

¹This statement is based on the writer's experience in budgeting for aviation support while serving as Afloat Budget Analyst on the Staff of Commander Naval Air Forces, Atlantic Fleet, from January 1970 through May 1971.

²Peter F. Drucker, The Practice of Management (New York: Harper and Row, Publishers, Inc., 1954), p. 225.

impossible, management task the supply officer has thrust upon him.

It is proposed that the inventory system presently utilized in the management of spare parts be replaced by a system which allows the manager to determine his stocking objectives and gives him an incentive to produce positive results. As has been pointed out in a study of 308 industrial firms, an improved, efficient logistics system can reduce the on-hand inventory requirement by 50 per cent.¹

It is the opinion of certain personnel in the field of logistics management, including this writer, that the management criteria utilized by the Navy Stock Fund offers both the incentive and the tools for the supply officer to manage his inventory as well as substantially reduce the amount of excess material carried aboard the naval aircraft carriers.

Statement of the Research Question

The research question chosen for analysis and evaluation in this paper is:

Would shipboard implementation of the Navy Stock Fund (NSF) inventory management procedures reduce or eliminate the supply management problems now being experienced on naval aircraft carriers?

¹John F. McCarthy, Jr., Professor, Department of Management Science, The George Washington University, in a lecture given to the Navy Graduate Financial Management Class, on February 2, 1972.

To answer this question, a number of subsidiary questions must be answered:

1. What is the Navy Stock Fund concept and how would it apply to shipboard inventories?
2. What effect would the Navy Stock Fund inventory criteria have on the utilization of financial, material, and human resources?
3. Would there be any improvement in the budgeting and costing for aviation support?
4. How can operational readiness of fleet units be maintained under the revised management criteria?

Scope of the Study

The general overview of the study will deal with aeronautical support of aviation units with specific application toward inventory management afloat. Proven civilian management theories will be evaluated for possible application in the solving of the problem.

Purpose of the Study

It is the purpose of this study to analyze the feasibility of implementing the present Navy Stock Fund inventory management and accounting system on board naval aircraft carriers in a manner which will allow efficient, economical management without degradation of operational readiness of the fleet units. The implementation of this proposed system on major combat ships of the Navy has

been the subject of numerous studies and most recently was a significant point of debate lodged within the upper echelon of naval logistics support.¹ The size and complexity of the problem of shipboard inventory control validates the necessity for a detailed study of the subject.

Research Methods Utilized and Method of Analysis

The principal approach to the study was to delve into the problems of the present afloat inventory management and accounting systems and review some of the present and past material policies which have contributed to them. Where applicable, sound management procedures are proposed, which, if properly implemented, will reduce, if not eliminate, these problems.

The secondary research leading to this paper consisted of an exhaustive examination of government source documents relating to stock fund and aeronautical support in the Navy and Air Force. Numerous books, articles, reports, studies, and theses were reviewed and evaluated. Personal interviews conducted with officials associated with and experienced in the supply support and maintenance of Naval Aviation Weapon Systems as well as Navy Stock Fund Operations were utilized to the maximum.

¹Preliminary Report of SECNAV Ad Hoc Stock Fund Review Panel, Eli T. Reich, Rear Admiral, USN, Chairman, Appendix I: "Pricing, Surcharges and Credit Policy" (Washington, D.C.: U.S. Department of the Navy, May 28, 1970), p. 20.

The primary research is based on the writer's six years' experience in the area of supply support for naval aircraft. These six years were divided almost equally between the supply department of a naval air station, as aviation stores officer on an attack aircraft carrier, and as a member of the supply inspection team of Commander Naval Air Forces, Atlantic Fleet.

The method of analysis was based on extraction and isolation of relevant facts and ideas which pertained to the primary research question. After this task was accomplished, deductive reasoning was utilized as a means of determining whether the conclusions drawn were feasible from a logical point of view.

Organization of the Study

In order to acquaint the reader with the long history of success enjoyed by stock funds over the past eighty years, Chapters II and III examine the history, establishment, and concept of operation of the Department of Defense stock funds with specific emphasis on the Navy Stock Fund. The latter chapter deals with the who, what, and why of the Navy Stock Fund.

Chapter IV evaluates the present methods of provisioning for naval aircraft support which tend to create excessive stocking objectives and waste critical support funds. It proposes revised stocking criteria based on demand and sales under the Navy Stock Fund management criteria that will

provide for more efficient utilization of material, financial, and human resources. Some major incentives which will accrue from an inventory system that allows the manager to establish and partially control the stocking objectives of his individual unit are pointed out in Chapter V. This is accomplished by emphasizing the results to be expected when well-recognized management practices are applied in this area. In addition, this chapter inquires into the impact of the Navy Stock Fund Inventory Management and Accounting System on budgeting for and costing of supported naval aviation units.

Evaluation of the effects on operational readiness of fleet units which may result from being supported by the Navy Stock Fund procedures is conducted in Chapter VI. Various methods of measuring effectiveness are described and appraised. This evaluation is followed by a short comparison of operational readiness at present and the writer's evaluation of future effects, if any, on fleet readiness under the proposed system.

A brief summary of the main points and concepts of the study and a statement of some conclusions, with substantive reasoning, are presented in Chapter VII.

It is fully realized that, while the proposals and recommendations brought forth in this paper are based on sound management theory, the "real world" environment of shipboard operations may necessitate some deviations in order to achieve maximum effectiveness and efficiency.

Nevertheless, the basic concept appears sound and, if adopted, should result in improved supply support for fleet aircraft as well as substantial savings to the Navy, and ultimately to the American taxpayer.

CHAPTER II

THE NAVY STOCK FUND

The Origin and Early History of Stock Funds

The problem of having supplies and spare parts available at the right location, in the right quantity, and at the right time has been a major area of concern for logistics managers since cavemen put aside extra rocks and spare clubs for future use. No one knows who truly deserves the title of "father of the stock fund." One outstanding nominee, however, is Joseph, the Biblical storekeeper of the Pharoah's graneries who set aside excess grain in the plentiful years in preparation for the famine years of the future. In a general sense, the "stock fund" that he maintained is very similar to the stock fund that is conceived in the minds of most people today.

Although the use of stock funds in all services of the Department of Defense is relatively new, the original concept of this type of fund can be traced back to 1878 when a "General Account of Advances" was created in the Navy Department. Under this procedure, all payments for supplies by a disbursing officer first charged the General Account of Advances and later charged the annual appropriation

which used the supplies.¹ Since it derived its capital from the annual appropriations of the Navy, it lacked the flexibility of a true revolving fund which is not limited on an annual basis.

As might be expected under this limited concept, much confusion in matters of supply responsibility existed throughout the Navy.

Secretary of the Navy Herbert, in 1896, addressed some of the problems associated with the lack of specific control in the Department of the Navy prior to 1886:

The general-storekeeper system was established in the Navy ten years ago. Prior to that time the eight bureaus of the Navy Department acted independently of each other in the matter of purchases, and had different methods of purchasing, keeping accounts, caring for and issuing articles under their cognizance. This resulted in many differing systems of accounts, and also, as each bureau necessarily kept many articles in stock, in large and unnecessary accumulations of stores, bureaus often purchasing for their own use articles, large stocks of which were at the time lying idle in the storehouses of other bureaus. Secretary Whitney concentrated the entire system of purchasing for the Navy under the Paymaster-General, and established the general-storekeeper system, whereby all articles on hand, no matter under what bureaus, were consolidated for general use and placed under the control of the Bureau of Supplies and Accounts, which was held responsible for their purchase, care and issue. This order naturally encountered much resistance and may be expected to be more or less opposed as long as the bureau system obtains. Each chief is tempted to insist upon his right to purchase, upon

¹John W. Hempstead, "A Study of the Navy Stock Fund, 1893-1952" (unpublished Master's thesis, American University, 1953), p. 14.

which used the supplies.¹ Since it derived its capital from the annual appropriations of the Navy, it lacked the flexibility of a true revolving fund which is not limited on an annual basis.

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¹John W. Hempstead, "A Study of the Navy Stock Fund, 1893-1952" (unpublished Master's thesis, American University, 1953), p. 14.

the plea that he knows better than any other just what he needs.¹

In an attempt to eliminate some of the confusion as to who would have the responsibility for purchase, management, and distribution of Navy supplies, Congress enacted two important acts in 1889 and 1890. The first placed the responsibility for custody of supplies, together with the establishment of property accounts, within the Bureau of Supplies and Accounts.² The ensuing year proved that although the Bureau of Supplies and Accounts had been tasked with the responsibility for inventory management in the Navy, the operating bureaus would not furnish them the authority for use of their funds. To improve this situation, Congress passed a second act in 1890 which stated in part: "... all supplies purchased with moneys appropriated by this Act shall be deemed to be purchased for the Navy and not for any Bureau thereof, and these supplies together consolidated, and catalogued, and issued for consumption or use, under such regulations as the Secretary of the Navy may prescribe, without regard to the bureau for which they are purchased."³

These two acts resulted in significant improvements in the acquisition and control of material consumed in the

¹U.S., Department of the Navy, Annual Report of the Secretary of the Navy for the Year 1896 (Washington, D.C.: Government Printing Office, 1896), pp. 30-31.

²U.S., 25 Stat. 817, Act of March 2, 1889.

³U.S., 26 Stat. 205, Act of June 30, 1890.

operation and maintenance of Naval equipment, but the administrative details involved when the Bureau of Supplies and Accounts attempted to utilize various appropriations for purchase created excessive delays between the initiation of a requirement and its fulfillment.

In his annual report of 1892, the Paymaster-General of the Navy, Edwin Stewart, addressed this problem and recommended that authority and funds be granted by Congress to establish a permanent working capital. His report stated:

A source of embarrassment is found in the delay necessarily incident to filling emergency requisitions for articles not in store of which purchase must be made. The laws of 1890 and 1891 provide that all supplies purchased from appropriations for the naval service shall be considered as belonging to the Navy and not to any particular bureau. These laws have an admirable tendency to limit purchases to absolute foreseen necessities, as chiefs of bureaus naturally object to approving requisitions for the purchase of supplies out of appropriations under their control, which may in possible contingencies be diverted to the uses of other departments. There should, however, be always on hand sufficient supplies to meet constant demands. Delays would be obviated if there could be kept always in store a stock of ordinary commercial articles to be replenished from time to time by requisitions emanating from the general storekeeper. In order to secure this end by a method that could in no way be objectionable to the several bureaus, I would respectfully recommend that Congress be asked to create a fund amounting to \$200,000, to be known as the supply fund, out of which ordinary commercial articles may be purchased on requisitions originated by general storekeepers and approved by the Paymaster-General; such supplies when issued to the different departments to be charged against the proper appropriation, and the fund reimbursed and in this way kept intact. This would not entail any expenditure in excess of the regular annual appropriation; it would prevent detention of ships needed for sudden and immediate service and would enable the purchase by contract, after

public advertisement, of a large quantity of supplies which now must of necessity be procured in the open market under emergency requisitions.¹

As a result of this request, Congress created a "permanent" Naval Supply Fund in the total amount of \$200,000 in the spring of 1893. The utilization of the newly created fund was limited "to the purchase of ordinary commercial supplies for the naval service, and to be reimbursed from the proper naval appropriations whenever the supplies purchased under said fund are issued for use."²

The initial capital for the fund was advanced from the annual "General Account of Advances," rather than by separate appropriation. The permanent nature of the fund was provided in the creation of a legal entity which could purchase, hold, and sell supplies without regard to fiscal year limitations, and which would maintain its integrity from the proceeds of its sales to appropriated funds.

As this Act provided a major management tool for increased control and improved accounting, the Naval Supply Fund was well received by the Naval Bureaus. In fact, it was accepted and utilized to the degree that Congress found it necessary to approve four separate requests for additional working capital during the time frame of 1892 through 1902.³

¹U.S., Department of the Navy, Annual Report of the Paymaster-General of the Navy for the Year 1892 (Washington, D.C.: Government Printing Office, 1892), p. 5.

²U.S., 27 Stat. 723, Act of March 3, 1893.

³U.S., 32 Stat. 17, Act of February 14, 1902.

These additional funds expanded the fund until "working capital" within the Naval Supply Fund totaled \$2.7 million in 1902.¹

The Naval Supply Account

The events of the first decade of the twentieth century led to a major change in the method of accounting for the physical material in the fund and gave birth to the "Naval Supply Account," which was later changed to the Naval Stock Account as it is known today.

In 1907, after several unsuccessful attempts to have Congress appropriate more funds to finance his rapidly increasing requirements for the fund, Paymaster General Rogers drafted a letter for the Secretary of the Navy's release which directed "that all material which has been purchased from annual appropriations be transferred to and incorporated into the Naval Supply Fund. Thereafter all such material will have its value debited to the appropriations under which it is drawn and credited to the Naval Supply Fund."² Unfortunately, this letter was released by the Acting Secretary of the Navy in the absence of Secretary Meyer.

Thus, with one signature of a directive, the inclusion of the "common general stores" inventory in the amount

¹U.S., Department of the Navy, Bureau of Supplies and Accounts, History of Navy Stock Fund and Naval Supply Account [Washington, D.C., 1945], p. 13. (Lithographed.)

²Ibid., p. 14.

of approximately \$9.5 million raised the total value of the Naval Supply Fund to \$12.2 million, without the need of Congress to appropriate a cent by law.¹

Secretary Meyer, upon learning what had happened in his absence, declared the action illegal, since it was not sanctioned by Congressional law, and drafted a letter to the Attorney General requesting an opinion on the subject.²

Paymaster General Rogers vigorously opposed the Secretary's stand and presented the argument that "this transfer of stores was not an increase in the money value of the fund and that a distinction should be made between the stores or stock placed in the fund and the Navy Supply Fund and that the fund itself was not disturbed."³

At the recommendation of the Attorney General and Secretary of the Navy, with concurrence by Paymaster-General Rogers and the House Naval Affairs Committee, the accounting firm of Marwick, Mitchell and Company was employed "to study the whole situation as well as to devise a system of cost accounting for the various activities which managed the physical inventory of the fund."⁴

The recommendations which resulted from this extensive study eliminated many problem areas, and a significant portion of those recommendations which were put into effect are still in effect today.

¹Ibid., p. 15.

²Ibid.

³Ibid.

⁴Ibid., p. 18.

These recommendations were the basis for legislation which established the Naval Supply Account in 1910.¹ This act stated:

Naval supply account for the Naval Establishment: All stores on hand July First, nineteen hundred and ten, shall be charged to a naval supply account on the records of the Bureau of Supplies and Accounts, and all purchases of stock or expenditures for manufactured or repaired articles for stock at navy-yards or stations, during the fiscal years nineteen hundred and eleven and nineteen hundred and twelve, shall be charged to this account and be paid for from the "General Account of Advances."

The amount so advanced during the fiscal years nineteen hundred and eleven and twelve shall be charged to the proper appropriations as these stores are consumed from stock, and when disbursements made for all other purposes are accomplished, the amount so charged shall be returned to "General Account of Advances" by pay or counter warrants: Provided, however, that such material as provisions, clothing and small stores, medical stores, and such other materials as the Secretary of the Navy may designate, may be purchased by specific appropriations or transferred to specific appropriations before such materials are issued for use or consumptions. The said charge, however, to any particular appropriation shall be limited to the amount appropriated therefor.²

The provisions of this act were subsequently made permanent by the Act of March 4, 1911, which also abolished the "first permanent Naval Supply Fund."³ Because of the importance of the 1910 act, a short explanation is necessary. It combined all the stores in the Naval establishment into one fund, with a total value, including ordnance and ordnance stores, of approximately \$74.6 million.⁴ This amount was

¹Ibid., p. 19.

²U.S., 36 Stat. 792, Act of June 25, 1910.

³U.S., 36 Stat. 1279, Act of March 4, 1911.

⁴Navy Department, History of Navy Stock Fund, p. 20.

significantly more than the previous legal monetary limit of the Naval Supply Fund, which was \$2.7 million.

The wording of the new act allowed a limit in the amount set up on the books of the Treasury in the "General Account of Advances," which, in reality, was the total of the annual naval appropriations. This created speculation by Congress about whether a limit should be placed on the amount of funds that could be invested in stock, on the theory that large surpluses might arise as a result of unwise buying. However, the Secretary of the Navy dismissed its apprehensions with the issuance of General Order No. 69, which directed that:

In order to prevent any further undue accumulation of supplies and materials at the various navy yards and stations, the Department hereby directs that on and after July 1, 1910, all requisitions for stock supplies and materials shall be submitted to the Paymaster General of the Navy for approval or disapproval according to his judgment, based on the quantities reported to be on hand or available for shipment from other yards or stations.

Requisitions, i.e., those intended to cover purchase of supplies or material needed for immediate use or for a specific purpose, shall be submitted to the Paymaster General of the Navy via the bureaus concerned. If in the opinion of the Paymaster General any such requisition shall not be approved, then he shall disapprove and submit it immediately to the Department, with his reasons for the action taken.¹

Many of the requirements established by this order are still in effect for ordering the material that composes the Navy Stock Account portion of the current Navy Stock Fund.

¹Ibid., p. 21.

The accounting system for inventory management and reporting that was set up by the Bureau of Supplies and Accounts as a result of the Marwick and Mitchell study and report, in 1910, has remained the same, with the exception of a few minor refinements, and is utilized today.

Growth of the Fund from
1910 to 1939

The quarter-century from 1910 through 1939 saw the Naval Stock Fund put to extensive use in the successful procurement and management of the vast amount of material required for the Navy during World War I. Although the Fund was extremely active in an operational sense, there were few changes in its organization or purpose. The only legislation which reflected other than an insignificant effect on the Naval Supply Account's management during this time was seven acts dealing with equipage exemption,¹ disposal losses,² excesses and deficiencies in Navy appropriations,³ pricing,⁴ operating expenses,⁵ including transportation costs as a cost of material,⁶ and the stocking of publications and forms in the fund.⁷

¹U.S., 38 Stat. 405, Act of June 30, 1914.

²U.S., 41 Stat. 825, Act of June 4, 1920.

³U.S., 41 Stat. 1169, Act of March 1, 1921.

⁴U.S., 41 Stat. 1170, Act of March 1, 1921.

⁵U.S., 42 Stat. 132, Act of July 12, 1921.

⁶U.S., 45 Stat. 633, Act of May 21, 1928.

⁷U.S., 45 Stat. 1461, Act of March 2, 1929.

In an effort to dispose of excess war material, there was a significant trend toward substantially reducing the size of the fund during the span of "peaceful years" stretching from the close of World War I until immediately prior to World War II.

The total value of the Naval Supply Account as of the end of fiscal year 1921 was \$265.6 million, of which approximately \$250 million was invested in material.¹ By the end of fiscal year 1939, this excessive amount had been reduced to approximately \$70 million.² It is significant that not all of this reduction was excess material. A portion of it was brought about by the reevaluation of inventory and by outright recisions of cash in the amount of \$84 million, as well as by numerous donations to activities authorized by Congress during this period.³

Stock Fund Contributions During World War II

The deteriorating situation in Europe and the declaration of a state of national emergency by President Franklin D. Roosevelt on September 5, 1939, dictated that the fund again be expanded in preparation for war. Various Congressional Acts from June 11, 1940 through December 23, 1943, increased the fund over a billion and a half dollars.⁴

¹Navy Department, History of Navy Stock Fund, p. 37.

²Ibid., p. 64. ³Ibid., pp. 45-55.

⁴Hempstead, "Study of Navy Stock Fund," pp. 166-70.

The final portion of this legislation, in December, 1943, placed a limit on the fund in that: ". . . after June 30, 1944, the value of stock in the 'Naval Stock Account' plus the outstanding obligations under the 'Naval Stock Fund' shall not exceed \$2,250,000,000 at any time."¹

Two acts of legislation which were passed during that time span were important for reasons other than appropriation of funds. They were the 1942 acts of February 7 and July 3, which, respectively, removed the supplies and materials on board vessels from the Naval Supply Account Fund and changed the name of the account.

The February act read as follows:

Naval Supply Account Fund, \$160,000,000: Provided, that the value of the balances of supplies and materials on board naval vessels on January 1, 1942, shall be expended from the Naval Supply Account, as directed by the Secretary of the Navy, without charge to current appropriations.²

After World War II, the stocks of "general stores" carried aboard larger ships with central storerooms were once again financed under the Stock Fund. The stocks of materials carried on destroyers and smaller ships were expended to end use and placed in the custody of the departments that ordered them. This system was the standard operating procedure (SOP) until the early fifties when it was decided that shipboard inventories of general stores

¹U.S., 57 Stat. 626, Act of December 23, 1943.

²U.S., 56 Stat. 79, Act of February 7, 1942.

and repair parts could be managed and controlled through the use of allowance lists and load lists which were under the control of the fleet. This decision, in addition to a pronounced desire to reduce the accounting "paperwork load" of combat units, caused the abolishment of stock funded ship-board inventories. Instead, these stocks were charged to fleet operating funds when transferred to the ship. This procedure was also extended to fleet issue ships, tenders, and repair ships.

After the Korean conflict, when operating funds began to feel the impact of peacetime reductions, stocks of material carried aboard tenders and fleet issue ships could not be maintained at levels required for adequate fleet support. This problem was corrected by the return of stock funded inventories to fleet issue ships in 1955 and to fleet tender and repair vessels in 1958.¹

Although the removal of ship's spares from the Navy Stock Fund was supposedly an effort to eliminate the burden of accounting functions under a combat environment,² it is significant that inventories on board combat vessels, with the exception of tenders and repair ships, have not been

¹U.S., Department of the Navy, Bureau of Supplies and Accounts, The Navy Stock Fund Annual Report for Fiscal Year 1958, NAVSANDA Publication 263, p. 5.

²Kermit E. Beck, "The Navy Stock Fund: A Tool for Economy and Efficiency" (unpublished Master's thesis, The George Washington University, 1968), p. 29.

returned to Navy Stock Fund management at the present time, which is twenty "relatively peaceful" years later.

In an effort to make the Naval Supply Account Fund a "true storekeeping account" and relieve various accounting transactions in the procurement of material and services not regularly stocked, the Navy Procurement Fund was established by Congressional Act of 1942, which read in part:

That there is hereby established under the Bureau of Supplies and Accounts the Naval Procurement Fund, and there is authorized to be appropriated from time to time such sums as may be necessary to accomplish the purposes of this fund: Provided, that thereafter expenditures may be made from the Naval Procurement Fund for material (other than material for stock) and for personal and contractual services under such regulations as the Secretary of the Navy may prescribe:

Provided further that the Naval Supply Account Fund shall hereafter be designated as the Naval Stock Fund. . . .¹

The major problem concerning the fund during World War II appears to have been the loss of control that resulted from the explosive growth of operations. This loss of control is exemplified by the fact that in March, 1943, the fund had a \$600 million deficit, caused by the prevailing concept of getting the supply job done without regard to financial considerations.

The return to a peacetime level of operations and the reduction of accumulated inventories provided excess cash in the fund. During 1946 and 1947, Congress provided

¹U.S., 56 Stat. 646, Act of July 3, 1942.

²Navy Department, History of Navy Stock Fund, p. 71.

for rescission of approximately \$750 million from the Naval Stock Fund and its return to the Treasury or transfer to other appropriations. From 1947 to 1949, when Congress was considering wider use of working capital funds within the Defense Department, activity in the Naval Stock Fund was routine. The Naval Stock Fund, however, was serving a larger purpose than support of the Navy: by its example of an established, effective supply and financial system which had supported Naval operations in three wars, it led the way for wider use of stock funds in the Department of Defense.

Stock Fund Enlargement to Entire
Department of Defense

The stock fund, or "working capital" concept, was greatly enhanced in 1948 and 1949, when the Commission on Organization of the Executive Branch of the Government (the First Hoover Commission) conducted its review of governmental organizations and operations. A substantial portion of this review was devoted to study of the operation of the National Security Organization.¹ Specifically, it recommended that the Secretary of Defense direct and supervise a major revision of the entire budget system, with particular emphasis on initiating a performance-type budget.² The

¹U.S., Commission on Organization of the Executive Branch of the Government, Herbert Hoover, Chairman, National Security Organization, A Report to the Congress (Washington, D.C.: Government Printing Office, 1949).

²Ibid., p. 12.

precedent that the Naval Stock Fund had set for working-capital funds was well recognized in the consideration of the proposed legislation. The Senate and House reports on the bill both discussed the Naval Stock Fund,¹ emphasizing its long existence and the benefits achieved by proper handling of inventories of common use items. In this vein, the testimony of W. J. McNeil, who was later appointed Assistant Secretary of Defense (Comptroller), submitted that:

The Department of the Navy has had this very excellent tool for management for 54 years. It started 54 years ago, as a rather small business operation, and was very helpful in World War I. It was carried on in a substantial size through the twenties and thirties and stood the test of World War II in excellent fashion.²

After review of the recommendations of the First Hoover Commission, and with President Truman's urging, Congress passed a bill which was known as Title IV of the National Security Act of 1947, as amended. "In order to more effectively control and account for the cost of programs and work performed in the Department of Defense," the legislation authorized the Secretary of Defense

to require the establishment of working-capital funds in the Department of Defense for the purpose of

(1) financing inventories of such stores, supplies, materials, and equipment as he may designate; and

¹U.S., Congress, Senate, National Security Act Amendments of 1949, Rpt. 366, 81st Cong., 1st sess., May 12, 1949, pp. 292-93; and U.S., Congress, House, Reorganizing Fiscal Management in the National Military Establishment, Rpt. 1064 81st Cong., 1st sess., July 14, 1949, pp. 9-10.

²U.S., Congress, Senate, Committee on Armed Services, National Security Act Amendments of 1949 (Washington, D.C.: Government Printing Office, 1949), p. 2669.

(2) providing working capital for such industrial-type activities, and for such commercial-type activities as provide common services within or among the departments and agencies of the Department of Defense, as he may designate.

• • • • •
 (b) The Secretary of the Treasury is authorized and directed to establish on the books of the Treasury Department at the request of the Secretary of Defense the working-capital funds established pursuant to the authority of this section.

(c) Such funds shall be . . .

(1) charged, when appropriate, with the cost of stores, supplies, materials, and equipment procured or otherwise acquired, manufactured, repaired, issued, and consumed and of services rendered or work performed, including applicable administrative expense; and

(2) reimbursed from available appropriations or otherwise credited for the cost of stores, supplies, materials, or equipment furnished and of services rendered or work performed, including applicable administrative expenses.

Reports of the condition and operations of such funds shall be made annually to the President and to the Congress.

• • • • •
 (h) The appraised value of all stores, supplies, materials, and equipment returned to such working-capital funds from any department, activity, or agency, may be charged to the working-capital fund concerned and the proceeds thereof shall be credited to the current appropriations concerned; the amounts so credited shall be available for expenditures for the same purposes as the appropriations credited. . . .¹

Since this time, the monetary portion of the Navy Stock Fund has been regulated through the apportionment procedures in the budgetary process.²

Although the Navy was well experienced in the operation of a "revolving fund," the requirements imposed by the act

¹U.S., Public Law 216, 81st Cong., August 10, 1949.

²Robert D. Fischer, "The Navy Stock Fund" (unpublished Master's thesis, The George Washington University, 1962), p. 12.

necessitated some changes in its method of operation. While the principal purpose of the fund had been to finance inventories of supplies and equipment, over the years the fund had also become involved in financing manufacturing and processing activities. The principal operations of this nature were the following:

- Coffee roasting
- Cutting and fabricating items of uniform
- Foundry work on small castings
- Generating and bottling of gas
- Manufacture of electrical fittings
- Paint mixing and blending
- Renovation of petroleum drums
- Rope manufacture.¹

As the new operating regulations did not permit activities of this type in stock funds, these activities were ceased either by termination or by transfer to the new Navy Industrial Fund. This action was completed by fiscal year 1953.

Under the authority contained in Section 405 of Public Law 81-216, the Army and Air Force established a stock fund in the latter half of 1950.² Both of these funds were established on a very limited basis relative to what they would encompass in the next few years. The Marine Corps was

¹U.S., Department of Defense, Office of the Comptroller, Working Capital Funds of the Department of Defense, Annual Report to the Congress for Fiscal Year 1952 (Washington, D.C.: Government Printing Office, 1952).

²U.S., Department of Defense, Office of the Comptroller, Working Capital Funds of the Department of Defense, Annual Report to the Congress for Fiscal Year 1951 (Washington, D.C.: Government Printing Office, 1951).

the last military service to commence stock fund operations, on July 1, 1953.¹

A fifth stock fund was added to the Department of Defense with the establishment of the "Defense Supply Stock Fund" on January 1, 1962. This fund was established to finance the inventories of the Defense Supply Agency. The significant difference between this fund and the service stock funds is in the method of operation. The Defense Stock Fund inventory consists entirely of "wholesale" stocks, procured from industry and held for sale to other "retail" stock funds of the services for ultimate sale to users, while the service stock funds include both "wholesale" stocks (for items not under Defense Supply Agency cognizance) and "retail" stocks positioned near points of ultimate use.²

The establishment of the Defense Supply Stock Fund has had a tremendous effect on the operation of the stock funds of the military services. Since the stocking criteria for this fund is "to include all material which is commonly used by two or more of the services," it has absorbed a large portion of high-usage, fast-moving material from the inventories of the service funds. The result has been smaller inventories as well as a reduction of sales in a greater than

¹Alfred C. Taves, "Marine Corps Stock Fund 1953-1967" (unpublished Master's thesis, The George Washington University, 1968), p. 2.

²George W. Erdman, "The Use of Stock Funds in the Department of Defense" (unpublished thesis, Industrial College of the Armed Forces, 1964), p. 27.

one-to-one ratio of sales to inventory, because of the high salability of the material transferred to the Defense Supply Stock Fund.

It is significant that the Department of Defense is not the sole user of revolving funds in the United States Government. The index of the United States Code¹ carries a listing of over twenty governmental revolving funds of various types, without mentioning any that exist in the Department of Defense. Another type of major "working capital fund" other than the stock fund, which exists within the Department of Defense, is the industrial funds of the individual military departments and the Defense Supply Agency.

The Korean "police action" in 1950 again necessitated the expansion of the Naval Stock Fund as it had during previous periods of conflict (see Figure 1). A total increase of \$625 million was added to the fund as the result of laws passed in January,² May,³ and October⁴ of 1951. These cash augmentations permitted the fund to continue to provide effective current support of the naval establishment and to undertake an orderly program of increasing its readiness stocks to meet anticipated needs. While the fund was being increased

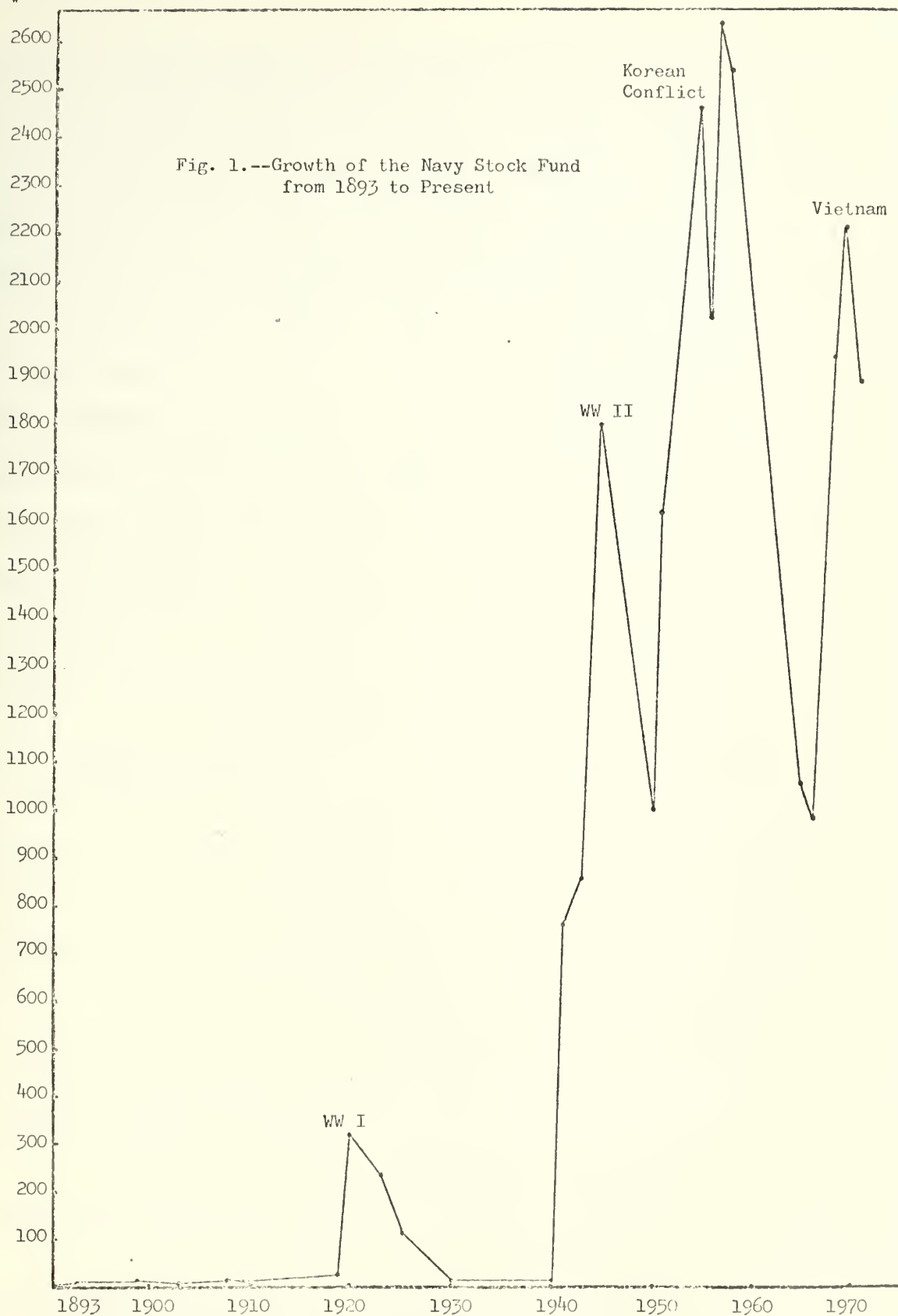
¹U.S. Code (1968 ed.), p. 11065.

²U.S., Public Law 911, 81st Cong., January 6, 1951.

³U.S., Public Law 43, 82d Cong., May 31, 1951.

⁴U.S., Public Law 179, 82d Cong., October 18, 1951.

\$ Millions



Source: Lynn Casselberry, "A Historical Perspective of the Navy Stock Fund" (unpublished Master's thesis, The George Washington University, 1967); and Department of the Navy, Navy Stock Fund Annual Report for Fiscal Years 1969; 1970; 1971.

to support the war effort, individual extensions of the stock fund concept were being accomplished. Medical and dental supplies in the amount of \$96,536,935 were capitalized into the Navy Stock Fund on June 30, 1952,¹ as were certain common electronics items totaling \$105,030,000 on June 30, 1953.²

As was to be expected, the ceasing of hostilities in Korea saw Congress anxious to reduce the Navy Stock Fund to a peacetime inventory to wait until another conflict required its expansion. It is interesting to note that with the inclusion of a \$250 million recision in Fiscal Year 1954, Congress had recouped over 50 per cent (\$1.3 billion of \$2.5 billion) of all funds which had been appropriated to the fund since its inception in 1893.³

Congressional Appraisal of Stock Funds

An indication of the effectiveness and efficiency that the stock funds were accomplishing in the area of military supply management is expressed in a statement in the Defense Department's report on working capital funds for fiscal year 1954:

¹U.S., Department of the Navy, Bureau of Supplies and Accounts, The Navy Stock Fund Annual Report for Fiscal Year 1952, NAVSANDA Publication 263, p. 4.

²U.S., Department of the Navy, Bureau of Supplies and Accounts, The Navy Stock Fund Annual Report for Fiscal Year 1953, NAVSANDA Publication 263, p. 3.

³U.S., Department of the Navy, Bureau of Supplies and Accounts, The Navy Stock Fund Annual Report for Fiscal Year 1954, NAVSANDA Publication 263, p. 36.

The stock fund has made a major contribution in the procurement aspect of supply management. It has facilitated the determination of fund requirements, by relating the allotment and control of procurement funds with issue requirements and existing stock levels. As a result, receipt to active stocks from procurement for fiscal year 1954 were approximately \$224 million less than the issues of \$1,281 million for the same period. This improved approach has resulted in cutbacks and cancellations of existing orders and has brought the "on order" position more nearly in line with requirements for production lead time.¹

In 1953, as part of the report of the House Committee on Government Operations, the stock fund concept was endorsed as follows:

The use of stock funds simplifies accounting and budgeting. Stock funds can improve the ability of a good manager to do an effective job in purchasing and in inventory control. It is generally acknowledged that the use of stock funds will simplify Congressional control of operations by allowing Congress to maintain control over consumption by the appropriate process with better knowledge of previous consumption and of quantities of repetitive use material on hand.²

The Second Hoover Commission, established in 1953 for a second review of the Organization of the Executive Branch of the Government, in its Budgeting and Accounting report issued in 1955, discusses several of the previously stated advantages demonstrated by Defense Department operations,³

¹U.S., Department of Defense, Office of the Comptroller, Working Capital Funds of the Department of Defense, Annual Report to Congress for Fiscal Year 1954, p. 19.

²U.S., Congress, House, Committee on Government Operations, Military Supply Management, Rept. 857, 83d Cong., 1st sess., 1953.

³U.S., Commission on Organization of the Executive Branch of the Government, Herbert Hoover, Chairman, Budget and Accounting, A Report to the Congress (Washington, D.C.: Government Printing Office, 1955), p. 39.

but also enumerates some negative aspects of the method:

The principal disadvantages of these revolving funds are that they minimize Congressional control of agency operations and that their widespread use can result in too many pockets of funds which become cumbersome from the standpoint of administration.

Our task force believes that revolving funds should be used only in situations where they provide greater economy and efficiency than do direct appropriations.¹

This feeling toward stock funds' apparently caused the Commission to make a recommendation "that the creation or continuation of revolving funds should be reviewed to determine if they add to efficient management, once the Government establishes appropriate accrual and cost accounting techniques."²

The Commission's report on the Defense Department's business organization treats working-capital funds slightly more favorably. It states that the revolving fund device has been found particularly valuable where a buyer-seller relationship exists; that such funds, reinforced by adequate cost accounting systems, contribute to improved management control; and that the continued and extended use of working-capital funds, where suitable, is endorsed.³

¹Ibid., p. 40.

²Ibid., p. 41.

³U.S., Commission on Organization of the Executive Branch of the Government, Herbert Hoover, Chairman, Business Organization of the Department of Defense, A Report to the Congress (Washington, D.C.: Government Printing Office, 1955), p. 78.

Recommendation 17 of this report states in part:

". . . the Department of Defense should continue and extend the use of systems of accrual and cost accounting and, wherever it will add to efficient management, the use of working capital funds. . . ." ¹ The report also notes that "when the capital in a stock fund exceeds the amount required to support the required inventory, the excess is readily highlighted, and Congress and the Secretary of Defense can take prompt action to reduce the size of the fund." ² This last statement was put to good use by Congress in later years as over \$1.1 billion was rescinded from the Navy Stock Fund in the period from 1954 through 1961. ³

Stock Fund Operations from 1955 to Present

During the years following the Second Hoover Commission report, great emphasis was placed on economy and efficiency in the Department of Defense, with specific attention focused on measuring and controlling the use of operation and maintenance appropriations. The Navy Department, therefore, reemphasized increased utilization of the Navy Stock Fund. An ad hoc committee, which was formed to "examine methods and procedures for material requirements determination and budgeting thereof," made the following recommendations regarding extension of the Navy Stock Fund:

¹Ibid., p. 79.

²Ibid., p. 81.

³Fischer, "The Navy Stock Fund," p. 33.

The Committee believes that the Navy Stock Fund should be extended to the APA (Appropriation Purchase Account) spare parts inventories. This should eliminate many of the shortcomings in the present requirements computations, budget preparation and management relationships.

The Stock Fund should have the following major advantages:

- (1) Parallel management and funding responsibilities.
- (2) Provide for a consumption type budget rather than a stock inventory budget.
- (3) Balancing of mobilization reserve stocks between inventories.
- (4) Determination of financial requirements of the SDCP's (Supply Demand Control Points) can be on a more current basis, closer to the time the annual Defense budget is submitted to Congress.
- (5) Simplify the accounting for material issued from the inventories and returned to store--all such operations will be from one fund.

. It is appreciated that the inclusion of all items of SDCP inventories will represent a departure from the original concept that only items of a "replenishable demand" nature are suitable for incorporation into the fund. The concept of "replenishable demand" type material must be broadened to encompass a more modern concept that items which have an "expected demand" are suitable stock to be included and are not necessarily subject to rapid turnover, and that the rate of stock turn cannot be used as a measure of the effectiveness of management when applied to the gross inventory valuation.¹

This proposal was a major change from the concept that the Navy Stock Fund had utilized up to this time. Throughout its history, the self-perpetuating nature of the Stock Fund was emphasized, and it was limited to the procurement of only those standard materials that were widely used throughout the Navy. Great care was exercised to avoid the stockage of

¹U.S., Department of the Navy, Office of Analysis and Review, Findings and Recommendations of the Ad Hoc Committee to Examine Methods and Procedures for Material Requirements Determination and Budgeting Therefor, 1955, pp. 1, 85. (Multilithed.)

supplies which had limited usage or limited shelf-life and thus might result in losses to the fund. Such minor losses as did occur were recovered through assessment of a surcharge on issue prices.

As was previously pointed out, Public Law 216 provides for stock fund financing of "all materials procured and/or stocked for supply purposes. This is intended to include all consumable types of material and relatively minor items of equipment. . . ." The Secretary of Defense was given authority to determine the particular stores to be financed under these working capital funds.

Within a year after this report was published, the Department of Defense issued an instruction which gave the following criteria for inclusion of items in stock funds:

All material procured and/or stored for supply purposes. This is intended to include all consumable types of material and relatively minor items of equipments, including parts and components used in manufacture, assembly, maintenance or rebuild of end-items for the military supply system. The term "consumable" material is used in the sense of covering all material which may be considered to be expended to operating and maintenance appropriations when withdrawn from a stock fund for use.¹

It is this liberalized authority which has served as a basis for the extension of stock fund financing to cover procurement of technical repair parts.

This capitalization of Appropriation Purchase Account (APA) inventories (photographic material, ship's repair parts,

¹U.S., Department of Defense, Principles to Be Observed in Determining Material to Be Included in Stock Funds, DOD Instruction 7420.5, November 26, 1956.

and electronic and vehicular equipment parts) was conducted without reimbursement,¹ during fiscal years 1956 through 1961, and amounted to approximately \$1,611 million.² By the end of fiscal year 1961, the only major category of consumables remaining outside the Navy Stock Fund was the aeronautical sparts, with an estimated value of \$2.5 billion.³ The size of the Navy Stock Account had grown from 260,000 items in 1954⁴ to 807,000 items in 1961.⁵

The capitalization of the APA material into the Stock Fund allowed the Navy to manage over three times as many items without an increase in capital. In fact, as previously mentioned, the Fund was able to return over \$1 billion to Congress from 1954 through 1961. This was the result of the efficiencies in the stock funding criteria. The capitalization of these inventories into the fund had the immediate effect of generating surpluses and items in long supply. (The reasons for this effect will be discussed in a later chapter.) Since these items were in long supply, they could be sold to the operating forces without the need for replenishment upon issue. Additionally, many items which had become

¹Secretary of the Navy Notice 4400, May 21, 1956.

²Fischer, "The Navy Stock Fund," p. 33.

³Beck, "The Navy Stock Fund," p. 35.

⁴Navy Department, Navy Stock Fund Report for Fiscal Year 1954, p. 4.

⁵U.S., Department of the Navy, Bureau of Supplies and Accounts, The Navy Stock Fund Report for Fiscal Year 1961, NAVSANDA Publication 263, p. 3.

obsolete by the technological boom of the fifties were declared surplus and disposed of at a loss to the fund.

Despite the criticism which had been brought about by the inclusion of "technical spare parts" into the Navy Stock Fund, the "net effectiveness of material availability in the system" for the selected categories of material which had been capitalized into the Fund had increased by 1960 as demonstrated by Table 1. The effectiveness of support was actually being increased, while economies were being made by the system.

In the year that followed, it appeared that the Navy logistics managers had established the "ultimate tool" for the management of military inventories. The Navy Stock Fund had finally commenced the financial management of all consumable inventories (except aeronautical spares) and that the operating appropriations were truly reflecting consumption costs. They were in good favor with Congress and with their bosses in the Department of Defense, as was expressed by the following comment by Congress:

The Army and Navy have made widespread use of stock funds in almost every applicable area. Their progress in the past five years is commendable.¹

The Department of Defense reiterated its policy by stating: "It has been and is presently the objective to

¹U.S., Senate, Committee on Armed Services, The Operation of Stock Funds in the Military Establishment, Report of the Preparedness Investigating Subcommittee, 86th Cong., 2d sess., 1960, p. 19.

TABLE 1
NET EFFECTIVENESS OF SELECTED CATEGORIES
OF REPAIR PARTS

Material Category	FY 1956	FY 1957	FY 1958	FY 1959	FY 1960
Electronics (N Cog)	82.0%	87.4%	89.0%	93.7%	91.4%
Ship Parts (H Cog)	77.6	85.3	89.2	92.1	89.9
Submarine Parts (P Cog)	N/A	89.9	88.9	97.0	90.2
Photographic Material (E Cog)	N/A	77.6	81.8	78.5	89.0

Source: U.S., Department of the Navy, Bureau of Supplies and Accounts, Inventory Control Operations at Supply Distribution Activities, NAVSANDA Publication 295, Fiscal Years 1956, 1957, 1958, 1959, and 1960.

extend as expeditiously as feasible the use of stock funds on a uniform basis for the military departments based upon maximum appropriate use of this authority.¹

It is ironic that, just two years later, in a report issued by the General Accounting Office in 1962, the balloon of Congressional praise should burst. The report, which was initiated by Congressman John W. McCormack, disclosed that

the preparedness . . . of individual Navy combat and service ships of the Atlantic and Pacific fleets, was being seriously affected by their inability to obtain repair parts and other material required for combat readiness although such material was available in the stock fund inventory. We found that the immediate cause for this was the insufficiency of consumer funds at the level of the ships to purchase this material from the stock funds. The inability to obtain the needed material significantly contributed to or was directly responsible for . . . ships being operated without certain essential material on board that would be needed in an emergency.²

The General Accounting Office further substantiated its report by disclosing that nineteen of thirty-one ships visited had shortages of over 1,700 line items in the total value of hundreds of thousands of dollars. This unfortunate situation existed even though in most cases the required material was available from supply sources in the individual ship's home port.³ A second part of the report disclosed

¹Ibid., p. 30.

²U.S., General Accounting Office, Report on Review of Stock Funds and Related Consumer Funds in the Department of Defense, Part I, June, 1962, p. 9.

³Ibid., pp. 27-28.

that "military activities resorted to various uneconomical practices in order to obtain parts and other combat material to accomplish their mission when consumer funds were short at their level,¹ such as "stripping" material from ships which were scheduled for decommissioning.

The report made a further recommendation that, in this writer's opinion, demonstrated that the auditors had missed the crux of the problem and possibly did not understand the theory behind the Navy Stock Fund operations. The recommendation was that:

The Secretary of Defense either (1) provide that consumer funds for repair parts and other combat material remain at the departmental levels rather than be allotted to and through the various command strata and that the procuring activities be reimbursed from these funds as material is issued to users or (2) eliminate completely the use of such consumer funds for repair parts and other combat material and have this material financed by annual appropriations from the Congress.²

The conclusion hypothesized by this writer is that the problem was one of insufficient appropriation funding for operating units to purchase the material which previously had not been chargeable through the Navy Stock Fund. This conclusion is explicitly pointed out in letters from both the Atlantic and the Pacific fleet commanders³ to the Chief of

¹Ibid., Part II, December, 1962, p. 6.

²Ibid., p. 11.

³Commander in Chief, U.S. Atlantic Fleet, Letter, serial 2936/41/440, dated August 30, 1962; and Commander in Chief, U.S. Pacific Fleet, Letter, serial 74/1067, dated March 26, 1962.

Naval Operations, in 1962, prior to the date of the General Accounting Office report.

The consumption figures on which the budget was based appear to be for actual items consumed on board the vessels. Under the revised procedure, the ships were paying not only for that consumption, but also for the buildup of onboard spare parts held in the storerooms. If this fact had not been considered during a period of rigid funding, as the late 1950's were after the cessation of the Korean conflict, limited funds would have been utilized for operating consumption only. The storeroom material would have become depleted as used because of the lack of sufficient funds for replacement of inventories.

The recommendation of the General Accounting Office poses a question in logic. How will the proposal to place consumer funds at the department level eliminate the problem of insufficient funding? This writer feels that it will be likely to create a larger problem as the ultimate consumer (the fleet unit) would consider all material "free issue" and refuse to let economy stand in the way of operational readiness. The department would be responsible for the funds but would have no direct control over the end user of these funds.

The recommendation "to have all repair parts and other combat material financed by annual appropriations from Congress" appears to be a giant step backwards in the attempt to evaluate true consumption costs of the fleet units.

The problems pointed out by the General Accounting Office and the fleet commander reports of similar conditions led to a study of the Stock Fund by the Department of Defense in 1962.

The approval of the recommendations of this study by the Secretary of Defense led to the removal of over 214,000 newly defined "principal" items valued at \$329 million from the Navy Stock Account during the fiscal years 1964 and 1965.¹

The reasoning behind this philosophy of including and excluding items from the Navy Stock Fund does not appear to solve the problem which was caused by lack of adequate consumer funds. The funding problem is not eliminated, but only pushed up the echelon of command, as the responsible bureau will still be required to maintain system stock.

A similar problem arose in the management of the Navy Stock Fund with the capitalization of 300,000 items of aeronautical consumable material valued at approximately \$1,048 million into the fund on July 1, 1968.² This transfer created substantial problems for the fund in the areas of budgeting, sales-turn ratio, and the existence of excess items.

¹U.S., Department of the Navy, Bureau of Supplies and Accounts, The Navy Stock Fund Annual Report for Fiscal Year 1964; and U.S., Department of the Navy, Bureau of Supplies and Accounts, The Navy Stock Fund Annual Report for Fiscal Year 1965, NAVSANDA Publications 263.

²U.S., Department of the Navy, Naval Supply Systems Command, The Navy Stock Fund Annual Report for Fiscal Year 1969. (Lithographed.)

These problems are approximately the same that arose when all Appropriation Purchase Account (APA) material was capitalized into the fund during the 1956 through 1960 time frame. As previously, a SECNAV Ad Hoc Stock Fund Review Panel was established by the Secretary of the Navy in November, 1969. However, this problem was different in that the Navy Stock Fund faced a "cash liquidity crisis" of an estimated \$110 million working capital deficiency for fiscal year 1970.¹ This crisis was deemed to be the result of "the Southeast Asia (Vietnam) buildup, the huge migration of aviation material to the Navy Stock Fund and the increasing ratio of insurance items to fast-moving items."²

In its report published on May 28, 1970, the committee made numerous comments and recommendations for improving the operation of the Navy Stock Fund. As the majority of these relate to or have a bearing on aviation support of the fleet, they will be evaluated and discussed in later chapters of this report.

Summary

Although numerous articles and studies on Naval Stock Fund history have been written over the past thirty years, the information which they contain is dated and tends to approach the history of the fund from a legislative angle. In this chapter, the writer has reviewed the fund's history from the

¹Preliminary Report of SECNAV Ad Hoc Stock Fund Review Panel, Eli T. Reich, Rear Admiral, USN, Chairman (Washington, D.C.: U.S. Department of the Navy, May 28, 1970), p. 1.

²Ibid., p. 6.

aspect of its long and successful operation and growth over the past eighty years, as well as citing important legislative actions pertaining to the fund.

The success and efficiency demonstrated by the Navy Stock Fund management system, even during times of turmoil resulting from extended periods of conflict, has enabled the Department of Defense Stock Funds to grow from a mere \$200,000 in 1893 to its present inventory value of \$9,384,000,000,¹ which generated annual sales during fiscal year 1971 of \$10,519,000,000.²

The favorable comments and expressed feelings of the various logistics experts and congressional reviewers over the years emphasize the efficiency and effectiveness of the Navy Stock Fund as an inventory management tool. Its proven outstanding history of managing inventories in the hands of such operating units as ships and support activities is a fact that should be recognized by today's Navy logistics managers.

The principal reason for the fund's exceptional success in inventory management is the concept of operation utilized. In the next chapter, this "revolving fund" concept is explained and evaluated in detail.

¹U.S., Department of Defense, Office of the Comptroller, Working Capital Funds of the Department of Defense, Annual report to the Congress for the year ending June 30, 1971 (Washington, D.C.: Government Printing Office, 1971), p. 69.

²Ibid., p. 71.

CHAPTER III

THE NAVY STOCK FUND OPERATIONAL CONCEPT

Authority, Purpose, and Concept

The Navy Stock Fund has been used by the Navy since 1893 as a means of financing selected categories of material. The present fund is operated under the authority contained in Section 405 of the National Security Act of 1947, as amended, and Regulations Governing Stock Fund Operations approved by the Secretary of Defense on January 26, 1967.¹

Its purpose is "to provide a simplified and effective means of managing, controlling, financing and accounting for, through the use of working capital funds, such materials, supplies and equipment as are identified under Section IV hereafter."²

In an attempt to arrive at a common basis of understanding, the following definitions of a revolving (working) fund are offered:

A working capital (revolving) fund used to finance inventories of stores, supplies and specified equipment, consisting essentially of material and cash. The cash portion finances all material

¹U.S., Department of Defense, "Regulations Governing Stock Fund Operations," DOD Directive 7420.1, January 26, 1967.

²U.S., Department of the Navy, Revised Charter for Navy Stock Fund, September 1, 1971, p. 1.

purchases and is reimbursed from appropriated funds upon issue (sale) of the material to the customer.¹

Working capital corresponds to industry's use of inventory and various asset accounts to hold resources in suspense until they are consumed. Within the Department of the Navy, the principal working capital devices are stock funds, which hold material in suspense until consumption. . . .²

. . . a revolving fund, established to finance inventories of supplies and other stores, or to provide working capital for industrial type activities (e.g., stock funds, industrial funds).³

A revolving fund is a fund established to finance a cycle of operations to which reimbursement and collections are returned for reuse in a manner such as will maintain the principal of the fund (e.g., working capital funds, industrial funds, and loan funds).⁴

The Department of Defense feels that the reason for existence of stock funds is to "finance the procurement of material that upon issue become expenses of the consuming agency. Generally the items included in the stock funds consist of supplies, minor items of equipment, and parts and components used in the manufacture, assembly or repair of end items of equipment."⁵

¹Bryan W. Ziegler, "The Navy Stock Fund Cash Position," Navy Supply Corps Newsletter, XXX, No. 3 (1967), 8.

²U.S., Department of the Navy, Financial Management in the Navy (Washington, D.C.: Government Printing Office, 1969), p. 187.

³U.S., Department of the Navy, Navy Comptroller Manual, Vol. I, Appendix A: Glossary of Terms Used in Comptroller Activities (Washington, D.C.: Government Printing Office, 1960), p. A-16.

⁴Ibid.

⁵Department of Defense, Working Capital Funds (1971), p. 65.

The Navy states that the primary purpose of the Navy Stock Fund is "simplification of financing, control, and accounting for the procurement and inventories of materials, supplies, and equipment."¹ A secondary purpose is: "greater financial flexibility and improved financial control of consumption of material through budgeting, financing, and accounting for the use of such material at the consumer level."²

The stated objectives of the Navy Stock Fund are to provide:

(1) Automatic funding for replenishment through reimbursement for material consumed.

(2) A deterrent to placing obligations other than when required because of the availability or non-availability of appropriations.

(3) Protection of Mobilization Reserve stocks for the use intended by replacement, when diverted through reimbursement from current appropriations.

(4) The measurement of budget estimates and costs of material issued based on consumption rather than purchase.³

The operation of a stock fund is the equivalent to a government-owned purchasing and distributing corporation, which serves as a "business" for items of supply in the Department of Defense logistics operation. Items of supply which are in demand by consumers--bureaus, offices, and operating forces--throughout the major services are purchased and distributed to pre-determined wholesale or retail locations by stock fund managers, and ultimately sold to "end-use" customers, who

¹Department of the Navy, Navy Stock Fund Annual Report (1958), p. 2.

²Ibid.

³Ibid.

reimburse the fund from annual appropriations. The basic principal of a stock fund operation encompasses a revolving cycle consisting of procurement, distribution, and withdrawal in much the same manner as exemplified by Figure 2. With the credit of the permanent corpus of capital, which was previously appropriated by Congress, supply items with recurring demand are purchased and distributed through established channels of supply to the operating forces of the military services. Upon the issue of this material from inventory to using activities, the appropriations granted for "end-use" functions are charged and the cash capital of the stock fund reimbursed, thereby generating additional funds for financing of a subsequent cycle of the fund. Except for the lack of a profit motive, advertisement, and the requirement to maintain a readiness position to meet future military emergencies, the concept is similar to that of any large commercial retailing enterprise such as Penney's or Sears, Roebuck and Company. This supply management concept "represents an effort to provide room for business management within the framework of a military organization and hence overcome many of the diseconomies known to exist therein."¹

Advantages and Disadvantages of the Navy Stock Fund

As is the case with any management system, considerable discussion has ensued between the proponents and opponents of

¹Arthur Smithies, The Budgetary Process in the United States (New York: McGraw-Hill Book Company, Inc., 1955), p. 316.

Fig. 2.--

Purpose of the Stock Fund and its Operation



Source: U.S., Department of the Navy, Bureau of Supplies and Accounts, History of Navy Stock Fund and Naval Supply Account (1945), p. 87.

stock funding. Although the statement made in 1920 by Paymaster-General McGowan in his annual report--"the specific advantage of the Naval Supply Account . . . and there are no disadvantages"¹--may have been biased, it is generally recognized that the Navy Stock Fund's concept of "revolving fund" has considerable merit. Some of the more important advantages and beneficial characteristics which this writer has been able to interpolate from the readings are:

1. Effects common use of inventories, thus reducing storage space necessary for individual unit backup stock.
2. Enforces supply discipline through cost consciousness incentives.
3. Facilitates more orderly and timely procurement.
4. Affords flexibility and quick response to customers' requirements.
5. Establishes a businesslike type of management.
6. Provides a method by which fleet activities with operational responsibility can be assured of obtaining needed material. With available funds, they are not dependent on someone else.
7. Economies over a free-issue system are realized through the requirement to pay for material.
8. Reimbursement from sales automatically provides funds for stock replenishment.
9. Consolidates operating and fiscal responsibilities under one management.
10. Improves budgetary control of expenses of operating activities by requiring funding for consumption of material.

¹U.S., Department of the Navy, Bureau of Supplies and Accounts, Annual Report of the Paymaster-General of the Navy, to the Secretary of the Navy, 1920 (Washington, D.C.: Government Printing Office, 1920), p. 21.

11. Permits procurement to continue without interruption at fiscal year's end.
12. Curtails incentive for fiscal year-end buying sprees.
13. Reduces peacetime operating stocks to a minimum, thus reducing funds required to provide working stocks of material.
14. By giving credit, encourages users to return unneeded items to stock.
15. By use of a standardized stock catalog, all customers know what material is normally stocked and available for issue.
16. Permits charging off deterioration or obsolescence of stocks when it occurs.
17. Lodges charges against proper "end-use" appropriations when material is consumed, not when ordered (improved costing).

Some of the disadvantages or undesirable characteristics of this system are:

1. Stock funds require more paper work with greater administrative costs. (This handicap could be eliminated with revised accounting criteria and the use of available computers.)
2. The apportionment controls imposed on stock funds by the Office of Manpower and Budget (OMB) negate the revolving nature of the funds to a slight degree and might eliminate some of the advantages of a stock fund.
3. From lack of consumer funds, military units may not be able to obtain needed supplies, even though the required items are on hand in the stock fund. This is also a problem in all accounting systems except "free issue."
4. If large numbers of "insurance" items or extremely slow-moving, highly technical material is stocked, stock obsolescence will impair the solvency of the fund unless Congressional action or pricing surcharge is applied.

5. Loss of Congressional control of purchases as stock fund purchases material without prior Congressional review or approval.
6. If high obsolescence factor exists, the surcharges imposed for recovery of losses will increase price of salable items to inefficient point, thus causing customers to buy elsewhere.

It is realized that these lists of the advantages and the disadvantages of the Naval Stock Fund method of operation are not to be considered complete by any means. However, they do serve the purpose of pointing out that the system has many more beneficial aspects than drawbacks.

As pointed out by Hitch and McKean, the use of stock funds is

expected to bring about three kinds of improvement. First, their managers will be motivated to conduct the operation more efficiently, because there will be an appropriate indicator of efficiency to be evaluated by superior officers; second, customers will be motivated to find cheaper substitutes or ways of using less of a product as they will not be able to get material as a free good; and third, the resources of the consumers will be put to their most valuable uses.¹

Management and Material Distribution in the Navy Stock Fund

Under the direction of the Secretary of the Navy and the Chief of Naval Operations, the Commander, Naval Supply Systems Command, will manage the Navy Stock Fund in conformity with DoD Directive 7420.1, "Regulations Governing Stock Fund Operations," and such other policy statements, appropriate regulations and procedures as may be issued by higher authority. The Navy Stock Fund, as covered by this charter, excludes all material financed under the Marine Corps Stock Fund.²

¹Charles J. Hitch and Roland N. McKean, The Economics of Defense in the Nuclear Age (New York: Atheneum Press, 1970), p. 225.

²Department of the Navy, Revised Charter, p. 3.

As a result of the growing significance of stock fund operations in all phases of Navy management, the Secretary of the Navy established the "Navy Stock Fund Board" on January 12, 1956. This board was charged with the express mission of "providing integrated Bureau and Deputy Chief of Naval Operations review and logistics guidance to the Commander, Naval Supply Systems Command who is the General Manager of the Navy Stock Fund."¹

In providing supply service under Navy Stock Fund operations, the Navy employs organization arrangements resembling those of private distributing enterprises. As noted above, central management of the fund is exercised by the Commander, Naval Supply Systems Command (NAVSUP) under regulations and procedures issued by higher authority.

Activities known as Inventory Control Points (ICP) are central business management headquarters for particular commodity areas of Naval material. The management in each of the seven Inventory Control Points specializes in related commodity lines which, in commercial practice, would frequently be the basis of a complete business organization. For the category of material assigned, each Inventory Control Point is responsible for requirements determination, procurement, inventory control, distribution, and other related supply functions on a Navy-wide basis. This responsibility

¹Department of the Navy, Navy Stock Fund Annual Report (1958), p. 3.

is exercised through the receipt and evaluation of recurrent stock status and financial status reports which reflect Navy-wide transactions and inventory position for particular items and classes of material.

The home offices of most of these concerns are physically removed from Washington to provide dispersal in case of an attack on the United States by a potential enemy. Table 2 gives a breakdown of ICP location and of the types of material managed.

Obligation authority is the primary means of control utilized for administration of the Navy Stock Fund. It is allocated to the various inventory managers principally to provide for necessary replacement of sales. Planned buildup or draw-down of stocks is the other major determinant of final allocation. The spread between contractual or obligating authority actually used and the sales income returned to the fund is the most significant factor. If the manager of the stock fund desires to decrease or enlarge the size of the inventory controlled by a specific Inventory Control Point, he will accomplish this by reducing or expanding the obligational authority available to that inventory manager. If the manager has inadequate funds, he will be unable to replace the material which he has sold, thus reducing his total inventory.

All material authorized to be purchased by the Navy Stock Fund will be carried in the Fund at Naval shore activities on a world-wide basis until sold or issued for use or until other authorized disposition is made.

TABLE 2

NAVY STOCK FUND INVENTORY CONTROL POINTS

Inventory Control Point	Location	Category of Material
Ships Parts Control Center	Mechanicsburg, Pennsylvania	Ships, Submarine and Base Repair Parts, Ordnance Repair Parts
Aviation Supply Office	Philadelphia, Pennsylvania	Aviation Consumable Material, Catapult and Arresting Gear Consumable Material
Electronics Supply Office	Great Lakes, Illinois	Electronic Repair Parts
Fleet Material Support Office	Mechanicsburg, Pennsylvania	Retail Clothing and Subsistence, General Retail Commodities, Retail Inventory System
Fuel Supply Office	Washington, D.C.	Fuels and Related Items
Navy Resale System Office	Brooklyn, New York	Ships Store and Commissary Store Stocks
Naval Publications and Forms Center	Philadelphia, Pennsylvania	Forms and Printed Matter

Source: U.S., Department of the Navy, Naval Supply Systems Command,
The Navy Stock Fund Annual Report for Fiscal Year 1971.
 (Lithographed.)

Stock Fund type material positioned in store rooms afloat may be carried in the Navy Stock Fund.¹

Each Inventory Control Point (ICP) designates a few major activities as distribution points. These are usually Naval Supply Centers (NSC) or Industrial Naval Air Stations (INAS) on each coast of the United States. These activities carry "wholesale stock" for the supply support of designated continental and extracontinental primary stock points and may also be assigned supply support responsibility for secondary stock points in the immediate area and overseas. Fleet units may draw required material from these activities on a "retail stock" basis.

The primary stock points, usually Naval Supply Depots (NSD) or major Naval Air Stations (NAS) support assigned secondary stock points and consumer activities on a wholesale/retail basis. The secondary stock points, both ashore and afloat, support the navy end-user on a strictly retail basis. These supply activities may be classed in one echelon of supply for material under the inventory control and one supply demand control point and at the same time be classed in another echelon of supply for material under the inventory control of another supply demand control point.²

In addition to the stock echelons, all Navy Stock Fund type material positioned in storerooms onboard the Mobile

¹Department of the Navy, Revised Charter, p. 5.

²U.S., Department of the Navy, The Navy Stock Fund Annual Report for Fiscal Year 1971, p. 1. (Lithographed.)

Logistics Support Force, as well as all commissary items, clothing and small stores, and ship's stores stock onboard afloat units are carried in the Navy Stock Fund until issued or purchased for end use.¹

This system of distribution is extremely flexible in that an end-user may actually draw material directly from any echelon of supply. The stores' accounting technique is such that material may move between any two levels of supply without regard to intermediate levels; for example, aircraft squadron storekeepers may draw material directly from a distribution point.

The Inventory Control Point accomplishes individual item management of the material located at the distribution points and primary stock points by means of daily transaction item reports (TIR). These reports, transmitted to the ICP by electronic means, itemize all issues, receipts, back-orders, dues, and so on, which may have transpired at that particular activity since the last report. This information is utilized by the ICP for updating his master computer to insure current stock visibility. An important point to be brought out is that there is no such line item reporting by secondary stock points. Therefore, there is loss of visibility of some portion of the Naval Supply System's inventory.

¹Ibid., pp. 11-13.

The What of the Navy Stock Fund Inventory

Today, seventy-eight years after enactment of the legislation which established the concept of financing supplies under a working capital type fund, the Navy Stock Fund bears little resemblance to its ancestor (the Naval Supply Fund) except in theory and principle.

The fund has increased from the original \$200,000 to its present level of \$1,759,165,000,¹ which is down from its peak inventory of \$2,082,023,000 in 1969.² Purchasing and stocking of "ordinary commercial" supplies have been extended to include material of the most technical nature on today's market.³ This expansion has resulted in annual sales for fiscal year 1971 of \$1,748.4 million.⁴

The Navy Stock Fund consists of a "cash corpus" and an inventory of material which is known as the Naval Stock Account (NSA). The Naval Stock Account contains only material which the Department of Defense classifies as "expense" type items. The remainder of Navy material (with the exception of research and development) which is available for use by consumers but is not carried in the Navy Stock Fund, is classified as "investment" items. This material is contained

¹Ibid., p. 6.

²Department of the Navy, Navy Stock Fund Annual Report (1969), p. 9.

³Ibid., p. 2.

⁴Department of the Navy, Navy Stock Fund Annual Report (1971), p. 3.

in Appropriation Purchase Accounts which are funded and managed by the various systems commands.

The criteria for determining the difference between "expense" and "investment" material is based on the consideration of the following criteria:

- (1) The intrinsic or innate qualities of the item, such as durability in the case of an investment item, or consumability in the case of an expense item; and
- (2) the conditional circumstances under which an item is used or the way it is managed.¹

A general definition for these items would be:

Expense item.--An item which is consumed in use on issue, or one which, although not consumed immediately, does not warrant the accounting and management effort required of investment items. These items are also called secondary items.

Investment item.--An end-item of equipment or repairable assembly which is managed centrally for one of the services. These items are also called principal items.²

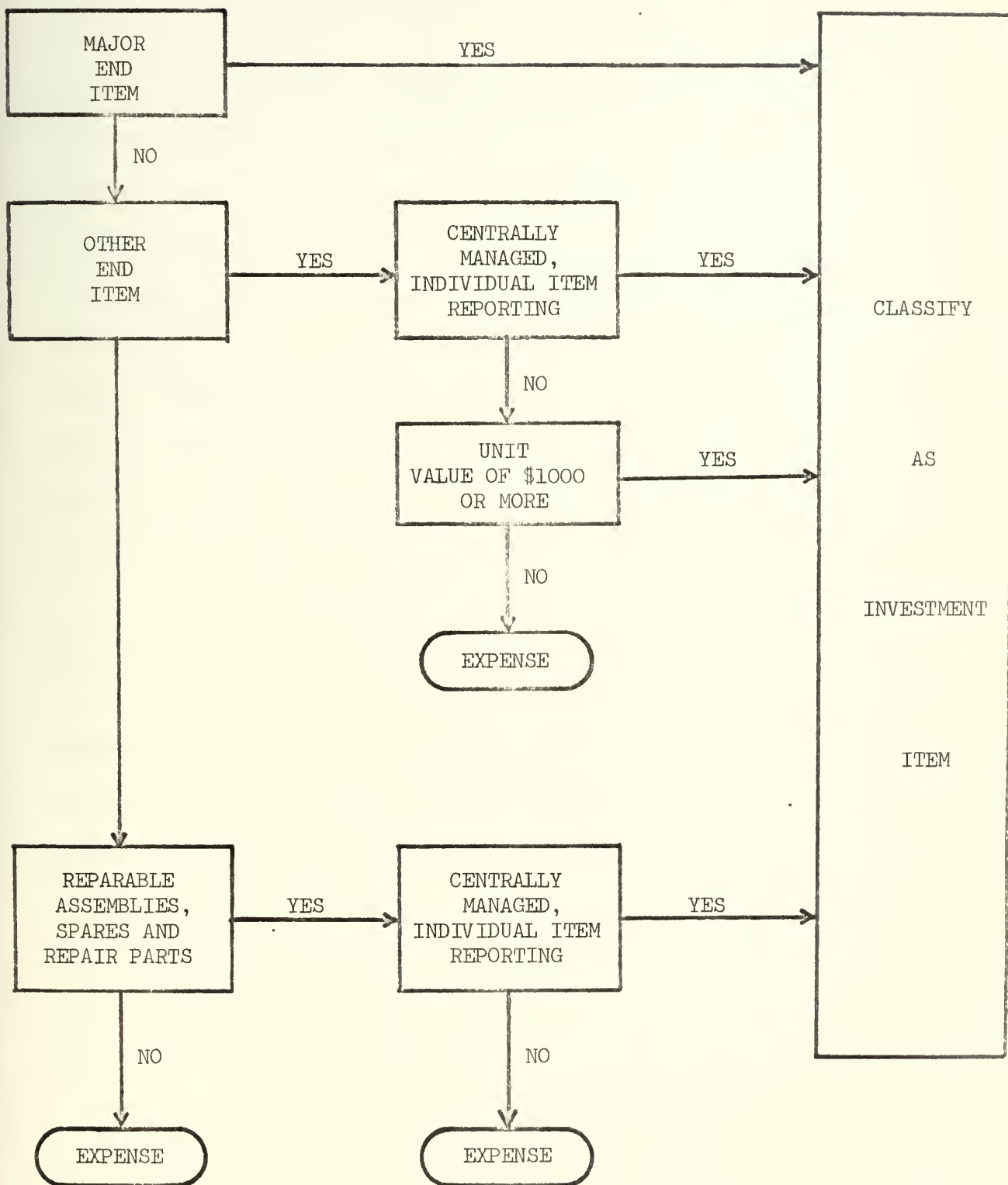
A simple decision diagram for determining whether an item should be classified as an "investment" item or an "expense" item is contained in Figure 3.

Expense items are funded by the Navy Stock Fund; therefore, issues are reimbursable. The consumer or requisitioner must reimburse the stock fund from end-use monies

¹U.S., Department of Defense, Definitions of Expenses and Investment Costs, DOD Instruction 7040.5, September 1, 1966, amended through March 29, 1968, p. 1.

²Ibid., p. 3.

Fig. 3.--Investment Cost Decision Diagram



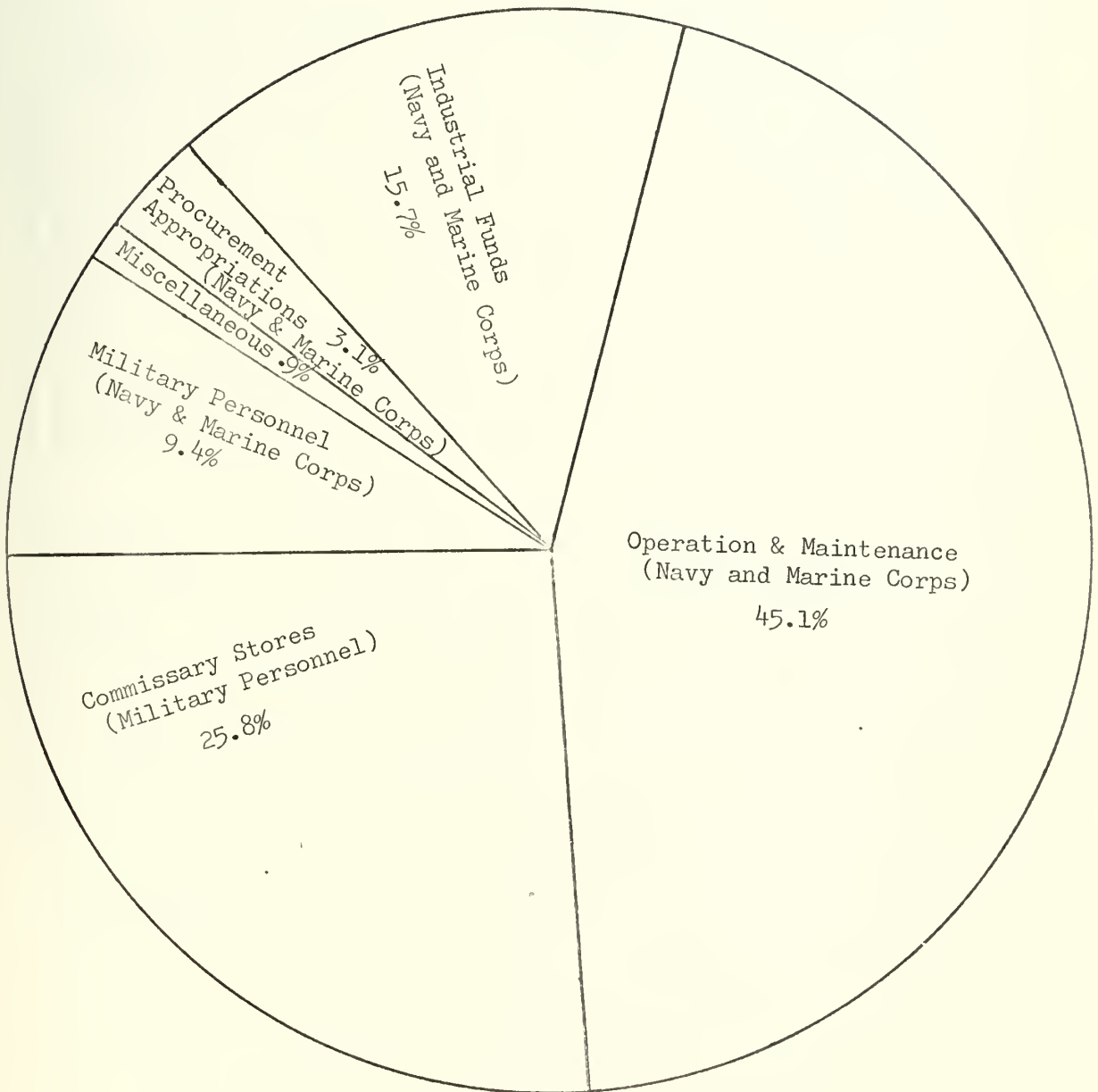
Source: U.S., Department of Defense, Instruction 7040.5, September 1, 1966, including Change 3.

such as operation and maintenance (O&MN) funds. In recent years, because of the performance budget push in the Department of Defense and because of more accurate costing information, there has been a tendency to capitalize APA stocks into the NSA of the Navy Stock Fund. Figure 4 gives a breakdown of the major end-use appropriations which purchased material from the Navy Stock Fund in fiscal year 1971. It is important to point out that the operation and maintenance appropriation furnishes 61 per cent of all sales (excluding commissary store sales, which are paid for by military members and their dependents in lieu of appropriations granted by Congress). Another 21 per cent of sales is generated by the industrial funds which repair Navy equipment and material.

In order for the reader to understand the volume and salability of the various classifications of material stocked in the fund, fiscal year 1971 Stock Fund operations have been summarized in Table 3. Although the stock turn ratio ($\text{sales} \div \text{inventory}$) for the total fund is one to one, there are some major variations to be found in the specific commodity groups. For instance, the high sales turn experienced in subsistence, fuel, commissary stores, and retail material is the result of two factors: (1) a very high demand by the user activities, and (2) a relatively short procurement lead time, which allows for small inventories in relation to sales.

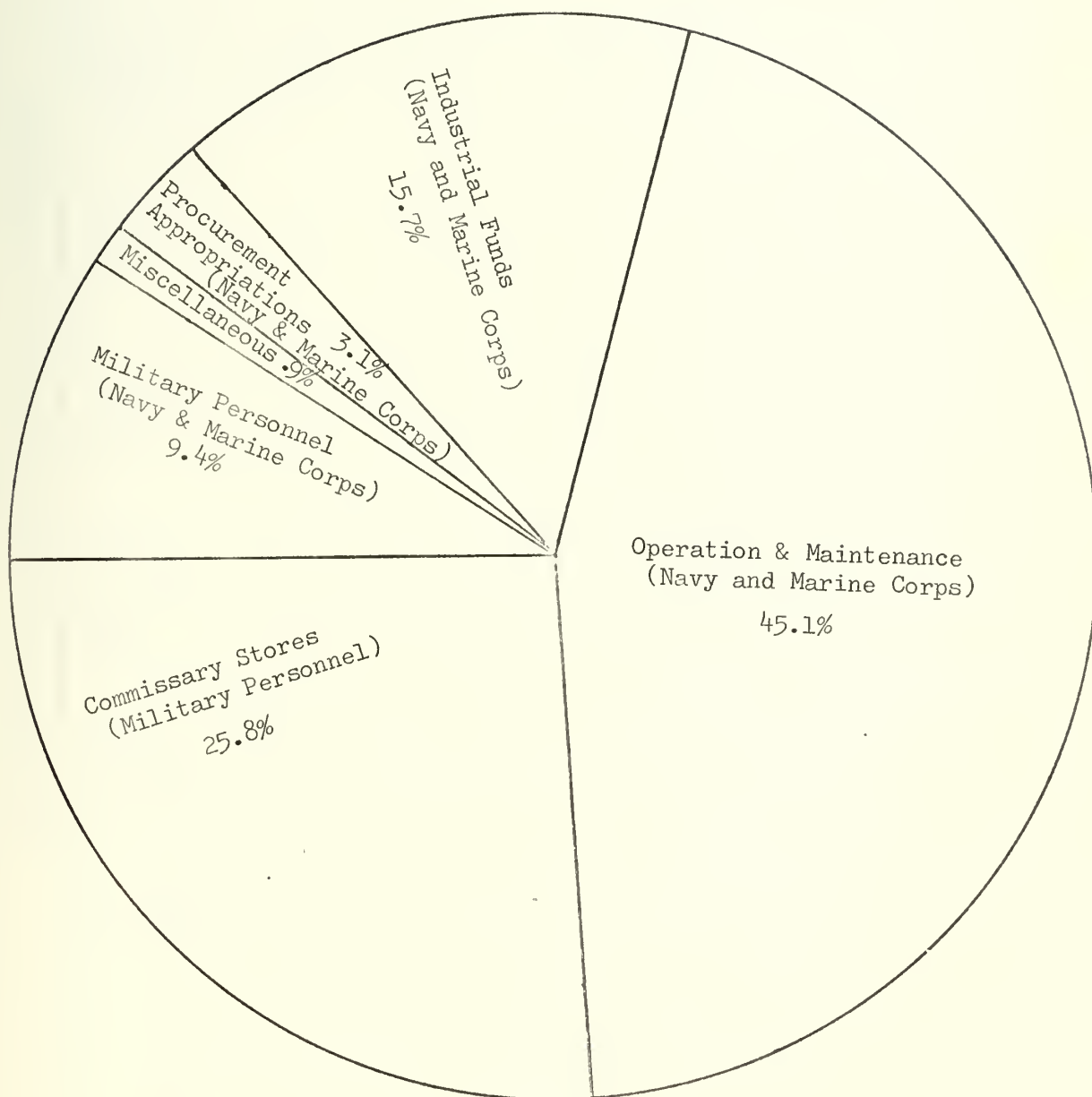
Just the opposite are the technical type materials managed by Ships, Parts Control Center (SPCC), Aviation Supply

Fig. 4.-- Major Customers of the
Navy Stock Fund



Source: U.S., Department of the Navy, The Navy Stock Fund Annual Report for Fiscal Year 1971.

Fig. 4.-- Major Customers of the
Navy Stock Fund



Source: U.S., Department of the Navy, The Navy Stock Fund Annual Report for Fiscal Year 1971.

Office (ASO), and Electronic Supply Office (ESO), which have a stock turn ratio of approximately once every three years. This low stock turn is the result of: (1) stocking of low demand (insurance) items, which are considered necessary in cases of emergency; (2) long procurement lead time for the complex, highly sophisticated repair parts; and (3) high rate of obsolescence because of rapid technological advancement of equipment supported by these repair parts. In some cases, an item of equipment has become obsolete and is replaced by an improved version prior to the procurement and delivery of the related spare parts to the supply system.

One of the criteria of material to be stocked in the Navy Stock Fund is that the item must have a recurring demand. It was desired not to tie up funds in frozen assets. This last criterion is one that contains significant features in relation to the actual composition of stock funds. It is important to note that recurring demand is the criterion. But no mention is made of the time period involved. In actual composition, there are thousands of items in the NSF which were acquired as insurance. Many of them are extremely slow movers, or non-movers which were acquired for their essentiality to military operations, not for their turnover characteristics.

The problems of frozen assets and high obsolescence have caused many repercussions in the areas of funding and budgeting for the Navy Stock Fund. First, the effectiveness

of any revolving fund inventory is depreciated by the existence of obsolescence. Second, the cash corpus of a revolving fund suffers as the result of lost sales reflected by obsolescence.

In response to these two problems, inventory managers, under the authority granted by the Department of Defense,¹ have established a surcharge which is added to the acquisition price of the item. This surcharge ranges from 1 per cent of item unit cost for ship's store and commissary stock to 24 per cent of item unit cost for forms and publications. The technical material managed by Ships Parts Control Center, Electronic Supply Office, and Aviation Supply Office has a surcharge of 20 per cent, 20 per cent, and 17 per cent, respectively.² This high surcharge on all items carried has the negative effect of forcing the consumer to buy materials at a lower price from commercial sources in order to conserve critical end-use funds. This loss of sales creates another rise in surcharges because sales are less than the amount the initial surcharge was based on.³ As is evident, this is a never-ending circle that requires correction if the fund is to generate enough sales to insure continuation of the "self-supporting" concept.

¹Department of Defense, DoD Directive 7420.1, p. 7.

²Department of the Navy, Navy Stock Fund Annual Report (1971), p. 5.

³Preliminary Report of SECNAV Ad Hoc Stock Fund Review Panel, p. 6.

Summary

This chapter delved into the management and inventory procedures of the Navy Stock Fund. From this review, the reader can see that it was intended that the fund's strict financial control and funding of assets create a higher degree of cost consciousness at the support base and user levels. Customers would be required to cite their appropriated funds for all withdrawals of material which is carried in the Navy Stock Fund.

Some special management problems that were created by the inclusion of technical repair parts in the fund were examined. The problems of stock turn, obsolescence, and insurance stocks will be discussed in greater detail in later chapters dealing with stocking objectives and budgeting and costing criteria.

These difficulties have raised the question: "What is the proper approach to stocking criteria in order to receive the most benefits for the amount of dollars expended?" This question and some proposed solutions to the problems are the subject of the next chapter.

CHAPTER IV

STOCKING OBJECTIVES FOR AERONAUTICAL MATERIAL

The Need for Inventories

Inventories of physical goods exist in all sectors of the economy, primarily for the purpose of making goods available to customers or producers without delay and to increase sales and profits. For example, an industrial concern must have raw materials and finished products on hand to avoid delay in production and to respond quickly to customer demands for a variety of finished products; a supermarket carries perishable fruits and vegetables because few customers are willing to wait for their demands to be filled from a truck farm; a retail clothing store must have a variety of items to display in order to attract customers. Although the profit motive is lacking, military inventory systems carry a diversified range of goods in sufficient quantity to satisfy the demands of fleet units without production and transportation delays.

Since inventories exist, it is natural to try to classify the types of items carried. Some of the adjectives commonly used to describe goods are perishable, raw, durable,

finished, hard, soft, technical, and general. Obviously, a given item might be described by one or more of these terms. However, two general classifications, namely, consumable and repairable, characterize any item. A consumable item is one that is either consumed in use or discarded after wear-out or failure. Examples of consumable items are nuts, bolts, paint, fuel, paper products, food, gaskets, resistors, and rags, to mention only a few. In general, a repairable item is one that can be repaired after failure or wear and will subsequently provide some flow of services to the user. Aircraft, engines, radars, aviation components, and hydraulic pumps are all examples of repairable items. They can be repaired by the ship or user, a local maintenance shop, or the manufacturer. More general terms utilized within the Navy are organizational (squadron), intermediate (supporting activity), or depot (Industrial Air Stations) levels of repair.

A more specific definition of a repairable item is that it is returned to a major repair point after use, overhauled or repaired, put back on the shelf in a ready-for-issue (RFI) condition, and reissued to a customer to satisfy a demand. The principal rationale behind designating an item as repairable is that it is more economical to repair than discard it.

Consumable and repairable item inventories in the Naval establishment are worth millions of dollars and require

extensive management effort. Therefore, once the inventory has been determined and procured, an effective system for control and management should be developed. In the military, prudent management of inventories normally contributes to increased weapon system effectiveness, decreased inventory investment, and decreased system costs.

In any system carrying consumable items, a set of rules for determining how much of an item to buy and when to buy it, i.e. an operating doctrine, must be established. In a repairable system, the procurement decision is augmented by an additional decision of how much and when to repair. Thus, the basic difference between a consumable and a repairable item inventory system is one of repair decisions.

As the repairable items are repaired and returned to the system in a "ready-for-issue" (RFI) status, they are normally carried in an Appropriations Purchase Account (APA). This account does not charge the end-user's funds upon issue. Consumables are just the opposite, in that they are expended from the logistics system as a charge to end-use funds upon their issue. Since this material is chargeable to end-use funds upon issue, it is normally carried in the Naval Stock Account portion of the Navy Stock Fund. Repairable items are almost never carried in the Naval Stock Account except for a few rare exceptions, such as aeronautical cognizance IIR material.

Since the overwhelming majority of shipboard or aircraft spare parts are of a consumable nature and as such are included in the Naval Stock Account, the inventory and stocking objectives discussed in this chapter will apply principally to consumable items. However, this is not to say that these objectives and ideas would not work with equal success on repairable items.

Determination of Inventory Level

A question that is imposed upon any inventory system or manager is: "What is the correct inventory which an activity should carry?"

Probably the most accurate answer that can be given to this question, at least from a theoretical aspect, is: "That amount of stock which will insure that there is always an ample amount, and no more, of material to fill any requirement placed upon the supporting activity."¹ The philosophy of this definition is that if an item could always be placed on the inventory shelf the instant prior to a requirement for that item, there would never be excess inventory or an out-of-stock situation.

If, by some stroke of magic, this situation were possible, there would be no problems with inventory or stocking. But in the "real world" of fluctuating demand, limitation of

¹Dr. Robert Holland, Professor, Department of Management Science, The George Washington University, lectures to the Navy Graduate Financial Management Class, October, 1971.

such resources as funds, space, time, labor and material, variable procurement or shipping lead times, and other unpredictable factors, this situation is an infinite probability.

The answers that are most often proposed for accomplishing the ideal inventory are usually the result of some form of qualitative analysis, such as cost-benefit comparison.

When cost-benefit ratio analysis is applied in the determination of the amount of inventory to be carried, that quantity of stock for which the marginal benefit of having one additional unit of inventory is equal to the cost of carrying one additional unit in inventory is considered the optimum stocking level.¹

In a commercial enterprise, the costs associated with determination of inventory quantity are divided into either the carrying costs or the costs associated with an inadequate inventory. The carrying costs consist of:

1. Cost of capital tied up in the inventory.
2. Storage costs of the inventory.
3. Depreciation and obsolescence.
4. Insurance and property taxes.

These costs are balanced against the costs associated with an inadequate inventory, which consist of:

1. Loss of sales (stock-outs).

¹J. Fred Weston and Eugene F. Brigham, Managerial Finance (New York: Holt, Rinehart and Winston, Inc., 1969), pp. 468-69.

2. Loss of customer goodwill.

3. Disruption of production schedules.¹

It is a proven fact that the carrying costs associated with inventory rise and fall are nearly proportionate with the rise and fall of the inventory level.²

The carrying of materials in inventory is expensive. In most cases, the annual cost of carrying a production inventory averages approximately 25 per cent of the value of the inventory.³

To assure a fair evaluation of the "right amount of inventory," the relationship of the costs associated with an inadequate inventory to the size of the inventory must be examined. As would be expected, these costs become smaller as the level of inventory increases.⁴ However, these costs are not proportional to the amount of inventory, as the carrying costs of inventory are known to be. As an example, if it is assumed that the value of the amount of additional inventory required to reduce the "stock-outs" of a firm from 15 per cent to 10 per cent is \$1 million, then, to reduce the stock-out percentage of that firm from 10 per cent to 5 per

¹Ibid., p. 473.

²Lamar Lee, Jr., and Donald W. Dobler, Purchasing and Materials Management (New York: McGraw-Hill Book Company, 1965), p. 229.

³Ibid., p. 228.

⁴Weston and Brigham, Managerial Finance, p. 469.

cent would require substantially more funds, perhaps as much as \$10 million to \$15 million more. This explanation helps to explain the earlier statement that the correct level of inventory is that level at which the cost associated with the addition of one unit will exceed the benefits achieved by the amount of that extra unit. A simpler definition of an economic inventory level is: "That level of inventory where the combined total costs of carrying the inventory and the costs associated with an inadequate inventory are least."¹

Military Method of Determining Inventory Stocking Level

The military application of cost-benefit analysis of inventory levels on board combatant ships would be classified by this writer as minimal, if considered at all. This statement is perhaps only partially true, in that most afloat inventory stocking levels are based on estimated requirements over a fixed period of time, which is normally ninety days. A tremendous premium is placed on the costs of having a "stock out" as a result of inadequate inventory. Admittedly, this cost, which in actuality is loss of fleet readiness, could be extremely expensive at certain times, as in a wartime combat situation. However, in most cases, especially in peacetime, few items of inventory would justify the extraordinarily high price placed on their unavailability.

¹Ibid., p. 470.

The major determination of the amount of investment in inventory, as recognized by most experts, is the level of sales¹ (demands from a military viewpoint). The demand criterion for Naval shipboard inventories is a period of time, such as from overhaul to overhaul, or six- to nine-months deployment. There is little correlation between the operating tempo of the ship and the depth or range of inventory to be carried. The age-old military concept of measuring stocks in so many "weeks of supply," while suitable for, say, the cavalry horses' feed, can be most dangerous when applied to spare parts for modern ships and aircraft.²

The problem of estimating which specific repair parts, and in what quantity, an aircraft will require while operating from a supporting activity is extremely difficult, for various reasons.

First, of the 100,000-odd kinds of parts listed for a modern aircraft, only about 50 per cent will be used at all during the life of the aircraft.³ Second, the demand pattern for spare parts for the same type of aircraft differs substantially between activities, because of differences in location, missions flown, age of the aircraft, and even the model and series of aircraft. About 10 to 30 per cent of the parts on a modern combat aircraft are peculiar to a model

¹Ibid., p. 468.

²Hitch and McKean, Economics of Defense, p. 272.

³Ibid.

and series, so that, if a new aircraft is being phased-in to the Navy, there is little experience with the demand for many of its replacement parts.¹

For the support of Naval aviation, the Navy attempts to base its demand data for spare parts on operating information more than on a specific time period, such as ninety days. Together with contractor representatives, knowledgeable members of the Aviation Supply Office and the Naval Air Systems Command prepare a document referred to as an Initial Outfitting List (IOL) for all aircraft and their major components. This document contains the part number, federal stock number, and nomenclature for all spare parts which this group feels will require replacement, and an estimate of the various quantities thought to be required at various flight-hour levels. In most cases, this document represents the judgment of personnel who are supposedly familiar with the equipment. The IOL is periodically (normally on an annual basis) reviewed and revised by operating, maintenance, and technical personnel, and hundreds of items may be added or deleted. Recently, maintenance demand data (3M reports) provided by the fleets have been used for this purpose.²

How successful is this method of projecting estimated usage? According to Hitch, "estimating parts consumption per

¹Ibid., p. 273.

²Ribble, presentation on October 20, 1970.

aircraft flying hours, while clearly valid for fuel and lubricants, has serious limitations when applied to spare parts."¹ Various studies dating from the early sixties² to the present³ show that less than one-fourth of the items on IOL's for different types of aircraft are actually utilized. Some specifics of these studies are discussed later in this chapter.

Results of Demand-Usage Studies for
Aeronautical Spares in
Naval Aviation

As indicated in the previous section, there has been little success in predicting the future usage rate of aeronautical spares. Hopefully, there will be improvement as better techniques for gathering maintenance data are utilized. An examination of studies conducted by the Navy in the area of excess material stocked on aircraft carriers over the last ten years is necessary.

A study sponsored jointly by the Office of Naval Research and the Bureau of Supplies and Accounts and conducted by The George Washington University in 1962 examined "the

¹Hitch and McKean, Economics of Defense, p. 273.

²Marvin Denicoff and Sheldon Haber, "A Study of Usage and Program Relationships for Aviation Repair Parts," The George Washington University Logistics Research Project, Serial T-140/62, August 7, 1962.

³Captain E. A. Grinstead, Jr., SC, USN, Assistant Chief of Staff (Supply), Naval Air Force, U.S. Atlantic Fleet, in a presentation to the 25th Annual Aviation Supply Officers' Conference, Philadelphia, Pennsylvania, on October 21, 1970.

general characteristics of usage at base level of aviation repair parts and components utilized by the all-weather jet fighter-interceptor F4D-1 aircraft." The usage and engineering data analyzed and evaluated in this study pertained to approximately 125 aircraft over a three-and-a-half-year period.¹

Some of the more important findings of this study were:

1. Of a total number of 1777 F4D-1 maintenance usage parts, only 59 parts, or 3 percent of the parts examined, were correlated with flying hours.²

2. Most repair items are not demanded at all. Sixty-seven percent of the installed parts and 64 percent of the components had no demand Navy-wide for the entire forty-two month period.³

3. The quantity of an item demanded by squadrons in a month is extremely low. The monthly demand was one in 45 percent of the parts requirements and 73 percent of the component requirements.⁴

4. A small number of repair items account for the bulk of the quantity of units demanded. Approximately six percent of the parts accounted for 80 percent of the total quantity of parts demanded over the entire period.⁵

These results have been duplicated by numerous studies conducted in 1964 for various types of aircraft⁶ (A4D jet bomber, WV-2 ASW Aircraft, HUS Helicopter, F8U jet fighter,

¹Ibid., p. 1.

²Ibid., p. 2.

³Ibid., p. 3.

⁴Ibid., p. 4.

⁵Ibid.

⁶Sheldon Haber, "A Comparison of Usage Data Among Aircraft Types," The George Washington University Logistics Research Project, Serial T-174/64, September 1, 1964.

and F4D jet fighter), and in 1965 for the F4B, A6A, and CH46A aircraft.¹ A somewhat similar situation in relation to low demand for consumable spare parts (bits and pieces) required for the repair of aeronautical components was discovered in a study conducted for the Department of the Navy by the Planning Research Corporation (PRC) in 1968.²

For informational purposes, a detailed study of demands placed on afloat inventories of shipboard repair parts in 1963-1964 made by Clifford Miller, of the Bureau of the Budget,³ revealed that the demands for material by shipboard users during the period from overhaul to overhaul (approximately three and a half years) was less than 15 per cent of the line items carried.⁴

Because the information contained in the above studies may be out of date, no further emphasis is placed upon them except to apprise the reader that the problem is not a new one but has been documented by the Navy almost from the beginning of aviation support.

¹W. J. Howard, R. G. Herrmann, and G. R. Hollington, "Evaluation of Optimum Allocation Program for Aircraft Spare Parts," Technical Military Planning Operation, General Electric Company, Santa Barbara, California, Serial control number 65TMP-58, September 30, 1965.

²Planning Research Corporation, "Bit and Piece Support of Aircraft Repairables Project," Prepared for the Department of the Navy, Naval Supply Systems Command, Control No. PRC R-1135, May, 1968.

³Clifford J. Miller, Bureau of the Budget, in a memorandum for Mr. Veatch, Bureau of the Budget, regarding Material Management Programs in the Navy, March 6, 1964.

⁴Ibid., p. 4.

The problem of stocking aeronautical repair parts aboard aircraft carriers in excessive quantities is still a major problem, as indicated by a recent presentation of problem areas at an Aviation Supply Officers' Conference. The Force Supply Officer for Commander, Naval Air Forces, Atlantic Fleet (COMNAVAIRLANT) pointed out that of the approximately 49,000 line items of Aviation Consolidated Allowance List (AVCAL) carried on board one Sixth Fleet aircraft carrier, only 6,752 items experienced any demand during a deployment.¹ This is a demand-usage rate of a mere 14 per cent of total AVCAL items carried. Another problem, which is related to the estimated usage figures, is that of the 6,752 line items which experienced demand, material was "not-in-stock" (NIS) 3,509 of the times it was requested,² indicating insufficient quantities were being stocked. A more serious problem, in this writer's estimation, is that 6,819 line items which were demanded were not carried or allowed in the stocking criteria of the Initial Outfitting Lists.³ This figure shows that for every item carried for which there was demand, one item was requested but not carried: $6819 \div 6752 = 1.01$.

These statistics are not peculiar to one aircraft carrier in the Atlantic Fleet, but to Pacific Fleet carriers as well. This fact is substantiated by statistics furnished

¹Grinstead, Presentation on October 21, 1970.

²Ibid.

³Ibid.

by the Aviation Supply Office's analysis of five Pacific Fleet carriers' demand history for a nine-month deployment. These five carriers supported identical aircraft, except for the series. Of the total of 141,735 line items carried aboard the five ships (most items are duplicated on each ship), those experiencing demand on any or all ships were 35,595, or less than 25 per cent.¹ Of these total demands, only 205 items (.14 per cent) were experienced by all five ships, 951 items (.67 per cent) were experienced by four ships, 2,668 items (1.88 per cent) by three ships, 6,780 items (4.7 per cent) by two ships, and 24,981 items (17.7 per cent) by one ship.² If the extraordinary demand for the one ship is disregarded as not being representative, then the total line items which experienced any demand on one ship is 6,780, or less than 5 per cent of the total of 141,735 line items carried.

What do these figures imply for inventory management of aeronautical spare parts carried on board Naval aircraft carriers? Assuming that the non-demand items have the same unit value as the demand items,³ it would appear that from 75 to 95 per cent of the funds allocated for afloat AVCAL

¹CDR R. L. Brunson, SC, USN, Director, Allowance Control Division, Aviation Supply Office, in a presentation to the 24th Annual Aviation Supply Officers' Conference, Philadelphia, Pennsylvania, on October 29, 1969.

²Ibid.

³This writer realizes that this assumption is possibly incorrect, but it is used because there are no statistics in this area and the resulting percentages will be the maximum possible, undoubtedly inflated.

inventories are tied up in dead stock (non-movers) which will will not be sold but be destined for disposal upon the introduction of a replacement aircraft into the fleet. A review of the amount of aviation material disposed of by the Navy in recent years (Table 4) would tend to authenticate the validity of this statement.

If the above quoted usage figures are utilized, between \$17,150,000 and \$21,850,000 of the inventory of \$23 million per aircraft carrier¹ consists of non-moving material. When this dollar figure is multiplied by the seventeen aircraft carriers presently operating in the Navy,² the magnitude of the apparent waste of "end-use" Operation and Maintenance funds can be visualized. Under the present system of financing AVCAL and shipboard inventories from end-use funds, this loss decreases the dollars available for more urgent requirements of operational training. The tremendous effect which the present system of inventory management creates on operational funds is attested to by the millions of dollars worth of excess material turned into shore (MTIS), without credit, by Atlantic Fleet carriers each year.³

¹Ribble, Presentation on October 20, 1970.

²U.S., Department of Defense, Department of Defense Budget for Fiscal Year 1972 (Washington, D.C.: Government Printing Office, 1971).

³Personal interview with Commander M. E. Anglim, SC, USN, Afloat Budget Officer on Commander Naval Air Forces, Atlantic Fleet Staff, December 29, 1971.

TABLE 4

ANNUAL DISPOSAL OF AERONAUTICAL MATERIAL
(in Millions of Dollars)

	Total Value of Inventory Carried	Total of Inventory Purchased	Total Value of Material Disposed of	Percentage of Total Inventory Disposed of	Ratio of Purchases to Disposal
1966	Not Avail	602	95	. .	6.3:1
1967	Not Avail	605	94	. .	6.4:1
1968	Not Avail	480	162	. .	4.0:1
1969	1,702	520	251	14.7	2.1:1
1970	1,793	750	279	15.8	2.7:1

Source: U.S., Department of the Navy, Aviation Supply Office, "Management Resume," for Fiscal Years 1969 and 1970.

Recommendations for Correction
of the Problem

How can the problems discussed in the previous section be either minimized or totally eliminated?

This writer believes that a revision of the provisioning procedure at the system level plus an inventory stocking objective based on generated sales will partially, if not totally, alleviate the stated problem.

The quantity of each repair part to support an item of equipment for a given period of operation is vital basic knowledge that must be computed into total requirements determination.¹

The provisioning process should be based on recorded maintenance demand data collected by the Naval Aviation Maintenance and Material Management (3M) system. These data should be analyzed and compared with the requirements data available at the Aviation Supply Office. The items that show low usage and/or designated insurance items should be stocked only at predetermined system stock points, and in very small quantities. When this material is required by an operating unit, its requisition and delivery will be expedited to the greatest extent possible.

For a new aircraft introduced into the fleet, usage data would be limited. This deficiency could be alleviated by requiring the contractor to provide the basic support for the aircraft until firm requirements data had been developed and adequate spare parts were available in the supply system.

¹Hitch and McKean, Economics of Defense, p. 272.

It is recognized that contractor support for this period of time would be extremely expensive. However, the choice between this expense and the expense of procuring millions of dollars worth of "unsalable" spare parts or of failure to have operational aircraft would appear to be positively in favor of purchasing contractor support.

Some criterion other than flight hours should be utilized for the IOL in the determination of depth of stock. This writer feels that using the "number of aircraft supported" as the criterion may have promise. This is an area where additional study may create positive results.

The supporting aircraft carrier should carry only those items known to be "sure movers," as shown by maintenance data and Aviation Supply Office records. In order to control the depth and range of material stocked, the afloat inventory should be carried under the Navy Stock Fund inventory management system. This system requires the generation of sales before obligational authority can be made available for increased procurement of stock. Under this system, if material is not "selling," there are no funds, and no requirement, for the ordering of more material.

This writer hypothesizes that implementation of the Navy Stock Fund inventory management system on Naval aircraft carriers would result in a substantial savings in financial resources required for maintaining inventory by a significant reduction of afloat inventories. Maintaining reduced

inventories would require fewer personnel and less storage space at the shipboard level, and at the system level by reducing back-up stock. The Stock Fund Accounting and Inventory Management System conceivably would be mechanized and thus cause no increase in work load at the shipboard level.

This proposed system would effect savings of operation and maintenance funds, as charges would be made only when material is consumed, vice when ordered. The material delivery lead time, or "pipeline," would be funded by the Navy Stock Fund, vice the present method of end-use funds. Under this system, the costs of obsolescence would be negligible because the majority of the stock would be sold. The small amount not sold would be returned to the system at no cost to the fund or the user, as it would only be physically relocated and would not be financially affected when transferred ashore.

In order for a system such as that proposed to prove effective, it would be necessary to improve the system's reaction time. The quantities of repair parts that should be stocked at a maintenance site are relative to the reaction time of the off-ship supplier. A competent supply system permits the user to reduce his inventory levels and thus the funds tied up in on-board inventory of maintenance material.

The cost and duration of the requisitioning cycle-- which starts with a requisition and ends with the receipt of

the material--is one factor in the determination of what parts to stock at supporting activities.¹

A method of reducing the period an aircraft is inoperable due to lack of parts, other than increasing range and depth of stock, is to reduce the length of the requisitioning cycle. This cycle can be reduced by shortening the time required to communicate the requirement or the time required to transport the material.² Fortunately, systems are presently available to aircraft carriers to reduce the time required for both of these functions.

The most promising opportunities for improving the communication process aboard afloat ships is the utilization of Automatic Digital Network (AUTODIN). This system electronically transmits punched card or magnetic tape information to the supporting supply system in minutes (as compared with days for a paper requisition to travel from ship to shore.)³ An additional benefit of this system is an easy method of transaction item reporting, to the Inventory Control Point, of all stocks carried in inventory and the accepting of requisitions to be filled from the Inventory Control Point.

The improvements in the Carrier on Delivery (COD) service to aircraft carriers have made it possible to deliver almost any required part (including aircraft engines) to an

¹Ibid., p. 275.

²Ibid., p. 276.

³Charles Luddeke, "Say It with AUTODIN," Navy Supply Corps Newsletter, XXVIII, No. 7 (1965), 38.

aircraft carrier from as far away as 1,200 miles in only a matter of hours.¹ The increased utilization of this system by the Navy should permit a big step toward lower stocking levels on shipboard inventories.

The effectiveness and feasibility of extending this system to support ships has already been demonstrated by its utilization on submarine and destroyer tenders, fleet repair ships, and fleet logistics ships for the past few years. There may be some critics who would question this writer's implication that an aircraft carrier is a support ship. This implication is based upon an analysis of its function and its relation to attached squadrons. Its function is to transport aircraft to a point within range of a target; to supply and resupply these aircraft with fuel and ammunition; and perhaps to repair them, as has been done and could be done again if the need arose. The aircraft squadrons attached to a carrier are separate entities of the Navy, with their own commanding officers and organization. True, the carrier has to be prepared to avoid or evade damage if it is attacked and to fight back with whatever weapons it carries if an enemy ship or aircraft should come within range; but so does an oil tanker, or a transport, or a reefer. These ships do not exist to avoid damage or to fight, but they have the inherent need, as does every individual, of self-defense.

¹LCDR Donald G. Ray and LCDR Billy G. Smith, "CVA Aviation Supply Support in WESTPAC," Navy Supply Corps Newsletter, XXIV, No. 2 (1971), 74.

A recent study of the logistics systems in the Department of Defense¹ indicates that certain functions will be mandatory if the inventory manager of the near future is to perform his job in an adequate manner. Among these are:

1. . . . a gradual separation of asset ownership and physical control. Future operational commanders will continue to control, move and use their assigned resources as combat conditions dictate, but overall ownership of distribution system stock should be vested in someone other than the operator such as rear echelon management points.

2. [Tomorrow's inventory manager should have] . . . worldwide knowledge of inventories from the point of production to the point of consumption by the end user. . . .²

The extension of the Navy Stock Fund inventory management system to afloat inventories and the implementation of transaction item reporting (TIR) would be a major step toward fulfillment of these requirements.

Summary

This chapter has discussed the problems of excess stock which exists in the Naval logistics system, with specific attention devoted to excess aeronautical spare parts onboard aircraft carriers.

The importance of the correction of this problem was emphasized by a previous commanding officer of the Aviation Supply Office:

¹U.S., Department of Defense, Office of the Assistant Secretary of Defense (Installations and Logistics), Logistics Systems Blueprint (Washington, D.C., August, 1969).

²Ibid., p. III-7.

The major portion of our Naval Aeronautical supply effort is devoted directly or indirectly to the support of aircraft carriers. The embarked Carrier Air Wing (CAG) on the carrier is the primary Navy weapon. All of our sophisticated inventory management procedures ashore are in vain if we do not produce a stocking criteria that will place the right material on a supply officer's shelf on a deployed carrier at the right time and at the right place.¹

Various methods of determining the proper stocking level were discussed, and a revision to the present inventory afloat system was recommended. This system, if adopted, should effect savings in material, personnel, and financial resources.

In addition to the substantial savings which should result from the implementation of the Navy Stock Fund inventory management system onboard Naval aircraft carriers, it is envisioned that numerous management incentives would accrue to the shipboard personnel associated with inventory management afloat. These management incentives are the subject of the following chapter.

¹RADM Howard F. Kuehl, SC, USN, Commanding Officer, Aviation Supply Office, in Closing Remarks to the 20th Aviation Supply Officers' Conference, Philadelphia, Pennsylvania, October, 1965.

CHAPTER V

MOTIVATIONAL AND MANAGEMENT BENEFITS TO BE REALIZED UNDER THE PROPOSED SYSTEM

This chapter is designed to point out the problems and obstacles to motivation which are faced by the shipboard inventory manager in the afloat Navy today. Management concepts are presented and discussed that, if implemented, will help to eliminate many of these problems and create an environment which will allow for increased motivation and efficiency.

Current Problems in Management of Fleet Inventories

Some of the major problems now existing in inventory management aboard Sixth Fleet aircraft carriers were pointed out by the Commander, Naval Air Forces, Atlantic Fleet (COMNAVAIRLANT) Force Supply Officer's comments in a recent presentation:

. . . the Not Operationally Ready Supply (NORS) and Not Fully Equipped (NFE) aircraft situation has continued to worsen for three years. . . . A significant problem is related to the inability to locate material on board. . . . One of the primary deficiencies found aboard COMNAVAIRLANT ships was the extremely low validity of stock and location records. We estimate about 50% validity conditions when considering all types of errors. . . . The sheer volume of work and requisitions have resulted in almost uncontrollable record and status

data . . . poor performance in our mechanized environment has been a major contributor to the carrier's problems. . . . The volume of NORS and NFE outstanding requisitions poses an almost unmanageable situation for the carrier. . . . The validity of inventory and location records are so poor that the situation has become a serious challenge to our professional reputation. . . .¹

These selected comments concerning the shipboard supply management problems of COMNAVAIRLANT ships are indicative of the general shipboard problems throughout the major combatant ships of the Navy. The supply officer's function appears to have become the repeated extinguishing of brush fires, rather than the more systematic task of fire prevention.

What are the causes of this situation? The answers to this question are numerous and varied, depending upon who is asked the question. Some will say that inaccuracy of stock records is caused by the high tempo of operations, such as "the delivery of receipts in large volume lots, particularly just prior to--and during--at sea periods."² As this material must be "struck below" into the storerooms in an expeditious manner in order to "clear the deck" for operation of aircraft, the expected result is paperwork chaos between receipt of the material and posting of the receipts to the records. Another factor which has been offered as a cause of this problem is "a decreasing sense of responsibility for and awareness of our

¹Grinstead, Presentation on October 21, 1970.

²Ibid.

end product or mission . . . a national trend (Navy included) toward 'worker indifference.'"¹

This writer feels that the primary cause of poor stock record validity is the excess quantity of stores that the shipboard manager is required to manage with his given resources of personnel and space, which was previously discussed in Chapter IV. Many of the eighty to ninety storerooms on an aircraft carrier are remote and not readily accessible.² This inaccessibility fosters storing and issuing problems that in many cases may seem insurmountable to the young storekeepers that have been tasked with this unglamorous function. The resultant motivation problem was highlighted by the Commander, Naval Supply Systems Command, who stated:

In the eyes of some people, logistics and logistic support is not a glamorous profession. . . . Much of what we do tends to become routine and repetitive . . . the logistician all too often goes unrewarded.

.
Unchallenged, this negative reaction is a barrier to the recruitment of top people and a poorly managed logistics operation fosters what the author considers to be the top problem in the logistics field: proper motivation of our people, motivation to learn logistic support, and to stay in it long enough to make a meaningful contribution.³

¹RADM Paul F. Cosgrove, Jr., SC, USN, Deputy Commander for Supply Operations and Fleet Support, Naval Supply Systems Command, in a presentation to the U.S. Naval Supply Conference held in Annapolis, Maryland, April 22-24, 1968.

²Grinstead, Presentation on October 21, 1970.

³RADM Kenneth R. Wheeler, SC, USN, Commander, Naval Supply Systems Command, "Human Aspects of Logistics Management," Navy Supply Corps Newsletter, XXXII, No. 10 (1969), 26.

It must be stressed, however, that actual performance can only be facilitated by the system used. The abilities and motivation of the manager and his personnel constitute the major determinant of ultimate performance.

Motivation of the Manager

Successful plans for improvement in industry or government normally are based on some form of cost-reduction or cost-sharing. Recently, a new aspect, called participation, has been added, which helps to bring about profound changes in organizational relationships, attitudes, and practices.¹

Good managers are a scarce commodity and most all managers need some form of motivation.²

One form of motivation for the Navy manager is the probability of promotion which results from the fitness reports that are submitted by his senior officer. But, perhaps a more lasting and self-satisfying motivation would be his ability to control and manage better the job he is tasked with.

An apparent answer to the problems of morale and management would be increased motivation on the part of the people involved. A major motivation factor would be a reduction in the size of the inventory to a manageable level, as discussed in the previous chapter on stocking objectives.

¹Douglas McGregor, The Human Side of Enterprise (New York: McGraw-Hill Book Company, Inc., 1960), p. 110.

²Peter F. Drucker, Managing for Results (New York: Harper & Row, Publisher, 1964), p. 3.

Along with this reduction of inventory, there should be developed a system of management which can be utilized to evaluate the manager. One of the best known evaluations of a manager's performance is his ability "to seek the optimum relationships between inputs and outputs."¹ The optimum situation which all managers should strive for is "that combination of resources, out of all known combinations, that will produce the desired output at the lowest cost."²

A more general evaluation of a manager's performance would "be judged by the contribution which he makes to the 'well-off-ness' of the firm within the limits imposed on him by higher authority."³

The present system of funding shipboard inventories by means of appropriated funds does not provide a true measurement of input as the manager has little or no control over the amount of funds distributed to him for stocking of inventory. He is granted a set amount of dollars and is expected to spend the total amount and no more in the performance of his task. The inventory which he is required to stock is prescribed by persons who are in most cases not in his chain of command for operational performance. Since the

¹Robert N. Anthony, John Dearden, and Richard F. Vancil, Management Control Systems: Cases and Readings (Homewood, Ill.: Richard D. Irwin, Inc., 1965), p. 7.

²Ibid., p. 8.

³David Solomons, Divisional Performance, Measurement and Control (Homewood, Ill.: Richard D. Irwin, Inc., 1965), p. 105.

funds allotted and the stocking criteria for his on-board inventory of spare parts are not determined or influenced (except to a limited degree) by the local manager, his feeling of participative management is minimal.

Under the proposed afloat inventory management system (Navy Stock Fund), the shipboard supply officer and his men have the responsibility of maintaining the integrity of the supply system while at the same time meeting fleet requirements in the most efficient manner possible. Although the Commander, Naval Supply Systems Command is directly responsible for stock fund management and policy formulation in the areas of financial and inventory control,¹ guidance is provided in such a manner as to give the local manager maximum flexibility in meeting his obligations as well as operational commitments.

When the complexities of determining local policy for stocking, replenishment, material availability, and material turned into stores (MTIS), as well as the variances of demand and lead time that are due to geographic location or specific mission, are considered, it is readily evident that the inventory manager's task is massive. In most cases, his responsibility compares to or exceeds that of middle management in the business world of civilian enterprise.

The supply officer aboard ship is faced with interpretation and perpetuation of the basic philosophy of inventory

¹Department of the Navy, Navy Stock Fund Annual Report (1971), p. 1.

control. Proper management of inventories, regardless of the magnitude, is a problem which most people face on a daily basis, be they housewife or industrial executive. To manage an inventory properly, the manager must be able to predict what the consumers will require and when this material needs to be available for utilization. Assuming that there were no such constraints as storage space, funds, or availability of material, it would be feasible for the inventory manager to stock a ten-year supply of all possible material that the consumers might require.

Unfortunately, however, or perhaps fortunately, "resources are always limited in comparison with our wants, always constraining our actions. If they did not, we could do everything, and there would be no problem of choosing preferred courses of action."¹ As a consequence of resource limitation or constraint, managers strive to achieve the most desirable output possible within these constraints. If there were but a few line items to be managed, instinct and judgment would normally suffice. However, the number and complexity of the items to be managed preclude the use of instinct in the pursuit of the manager's assigned task, but they do not preclude the use of good judgment, in addition to other management tools.

In order to reach the point of "maximum output," the inventory manager must develop a management system which will

¹Hitch and McKean, Economics of Defense, p. 23.

attempt to obtain an acceptable "trade-off" between the investment in inventory and operational efficiency; i.e., maximum consumer support at minimum work load and inventory investment levels. This system must also provide the manager with a procedure for deciding what material requires replenishment and how much should be procured.

The Navy Stock Fund concept of "charging the consumer only at the time of consumption" provides the method of determining what and how much to replenish. From the standpoint of the inventory manager, reimbursements for sales of material provide the means for replenishment of stocks. Dependence on reimbursements from sales requires inventory managers to do a good job of forecasting sales; maintaining adequate, balanced stocks for sale; effecting timely and orderly procurement; and avoiding dead stocks.

The manager will replenish only the material that is being issued to his customers for consumption. If the consumer does not place a requirement on the inventory manager for certain material, it shows poor judgment to order an additional amount of a "non-mover." An obvious exception would be that a consumer had advised the manager of a projected demand for an item at some point of time in the future. The deciding factor for determination of the quantity to procure is the amount of sales generated. Since the manager's new obligational authority is based on the dollar amount of sales during the preceding reporting period, funds become the

limiting factor, or constraint. If a manager desires to order a larger quantity of a given item, he must improve sales. He must buy smaller quantities of those items for which there is less demand.

Allowing the manager the authority and responsibility for determining what he will carry in inventory (within certain general constraints) provides one of the key elements of a control system: "A manager must have responsibility and authority over the areas in which his performance is measured."¹

In a discussion of the motivational effect that would be gained by extending the stock fund management concept to cover all items of material used by the operating activities, Dr. Anthony, Assistant Secretary of Defense from 1965 to 1968, stated:

The system should motivate managers to be more concerned about the use of resources. Of course, efficiency is only one criterion for judging a manager, and attention to efficiency must never be permitted to overshadow the criterion of effectiveness, which means getting the job done, and done well. But managers need to know how efficiently their subordinates are performing their assigned missions, and the new system will help them learn this. It should, moreover, motivate managers to be more concerned with the wise use of resources, and therefore lessen the need for exhortation, inspection, specified constraints, and other devices that are now used as a substitute for a built-in motivation.²

¹Joseph L. Massie, Essentials of Management (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1971), p. 34.

²Robert N. Anthony, "Closing the Loop," in Perspectives in Defense Management (Washington, D.C.: Industrial College of the Armed Forces, November, 1967), p. 6.

Improved Costing Definition for
Operating Activities

The present method of costing applied to consuming activities does not accurately measure the costs of materials consumed in the operation and maintenance of Naval ships and aircraft. Under this system, the cost of material is lodged with the consumer when a material requirement is placed upon the logistics system.¹ No allowance is made for the actual time of consumption. Because of such costs as funding of pipeline, unused inventory, and erroneous orders, this procedure tends to inflate the actual costs that are recorded as operating costs for a particular weapon system.

In order to collect the actual costs of operating a weapon system, it is necessary for the Navy to develop an accrual accounting system for fleet funding. The necessity for accrual accounting was pointed out by the Second Hoover Commission, whose recommendation number fourteen states:

That Government accounts be kept on the accrual basis to show currently, completely, and clearly all resources and liabilities, and the costs of operation. Furthermore, agency budgeting and financial reporting should be developed from such accrual accounting.²

The Commission further chastised the appropriation-allotment system as a method of controlling costs by declaring:

¹U.S., Department of the Navy, Office of the Comptroller, Financial Management of Resources (Operating Forces) NAVSO P-3013, August 1, 1970, p. 4-12.

²Commission on Organization of the Executive Branch of the Government, Budget and Accounting (1955), p. 38.

The allotment system in itself does not usually provide management with the financial information required for measuring the efficiency and economy with which funds are used . . . the allotment system places emphasis on the ability to live within allotment rather than the usual management criterion of performance in terms of cost. Another defect in the allotment system is the inherent incentive to spend all allotted funds in order to support succeeding allotment requests.¹

The Commission felt that accounting and reporting systems must be responsive to the needs of management. This requires that they be designed to show the results of operations as they apply to organizational units.² Accounting which is limited to accounting for obligations and expenditures does not fulfill these requirements. These objectives can be met only if the accounting systems are maintained on an accrual basis.³

In a continuing effort to develop an accurate costing system that would separate consumption costs from inventory costs, Dr. Anthony, Comptroller of the Department of Defense in the mid-1960's, stated:

In the last 15 years, the military establishment has come a long way in making this separation between the costs of current consumption and inventory costs. The increasing use of stock funds and the purification of the operation and maintenance appropriations are examples. But the surprising fact to an outside observer is that the DOD has not gone the whole way . . . it seems to me that great value would be gained by holding most (other than certain weapons and their spares) items in stock funds and not charging them to appropriations until the time that they are consumed.⁴

¹Ibid., p. 68.

²Ibid., p. 69.

³Ibid.

⁴R. N. Anthony, "New Frontiers in Financial Management," Navy Comptroller Review, IX, No. 3 (September, 1962), 9.

Expanding on the concept of the stock fund as a suspense account mechanism for collecting expenses, Anthony felt that the use of working capital funds would be extended, as evidenced by the following statement:

The function of working capital is to hold assets in suspense from the time they are acquired until the time they are used by the final consumer, and we use working capital for this purpose currently; that is, we hold many items in stock funds . . . Stock Funds will be extended to include all consumable material, both wholesale and retail.¹

The Department of Defense, upon implementing "PRIME" in July, 1967, pointed out the necessity for expense accounting which would "charge measurable expenses to the programs and organizational units that incur them at the time the expenses are incurred."² In order to assure that this system would work, four "major changes" in accounting procedures were made. One of these is relevant to this paper; it is stated as follows:

Working capital funds, which hold assets in suspense from the time they are ordered until they are received by the final user, are being extended, so that operating expense accounts reflect only the expense of items consumed, and not the cost of items acquired but not yet consumed. Working capital accounts are being established for locally procured contractual services.³

¹R. N. Anthony, "What's Ahead," Armed Forces Management, XIII, No. 1 (October, 1966), 6.

²U.S., Department of Defense, Office of the Comptroller, Defense Resource Management Systems: Project PRIME (Washington, D.C.: Industrial College of the Armed Forces, 1967), p. 31.

³Ibid., p. 32.

These examples give the reader an insight into how the Department of Defense feels about the benefits to be achieved by extending the stock fund concept to the lowest possible echelon of support, such as naval vessels. For various reasons, the Navy has deemed it necessary to forestall implementation of the accrual accounting concept to fleet accounting, as directed by the Secretary of Defense in March, 1968.¹ However, in this writer's opinion, doing so has become a greater struggle each year, and fleet accounting will probably succumb to accrual methods within the next few years. This opinion is substantiated by an interpretation to this effect of some impromptu remarks that were made by a policy-making member of the Supply Systems Command in July, 1971.²

Summary

The discussion in this chapter has pointed out some of the present management problems faced by shipboard supply officers in their function as inventory managers. The motivational aspects that must be present to induce people to perform to their maximum cannot be overemphasized. The importance of people is conveyed by the question: "Where else could you get a computer that can carry itself around

¹U.S., Department of Defense, Secretary of Defense, Memorandum for Secretaries of Military Departments and Directors of Defense Agencies, March 3, 1968.

²Interview with a member of the Policy Making Board of the Naval Supply Systems Command, who wishes to remain anonymous, July 27, 1971.

where you need it, that weighs no more than 160 pounds and can be produced in mass quantities by young unskilled labor?"

Within this chapter a revised system for shipboard inventory management was proposed. The proposed procedure of managing shipboard inventories under the Navy Stock Fund concept emphasized not only the management benefits to be derived by the supply officer and his men, but also the more accurate costing and budgeting information that would be available under the proposed system as envisioned by the Department of Defense.

Realizing that the major argument against stock funding of afloat inventories on board combatant ships is the fear of reduced operational readiness of the fleet, the subsequent chapter will analyze and examine the effect, if any, that the proposed system would have on operational readiness.

CHAPTER VI

EFFECT OF THE PROPOSED SYSTEM ON OPERATIONAL READINESS

The Influence of Logistics on Fleet Readiness

Military doctrine, in broad terms, can be said to have three tangible components: the weapon system, the supply system (logistics), and manpower.¹ In this concept, the weapon system is considered a dependent variable, and the remaining two variables are independent.

When logistic support is insufficient, weapon systems are ineffective, and military actions are lost or victories delayed. An example of this was in late 1944, when the Allies seemed on the verge of driving into Germany to ultimate victory, but Generals Bradley and Patton's offensive drives were halted by lack of gasoline and ammunition. For over two months, their operational plans were constrained by specific supply limitations.²

The decisive factor that logistical support can have on the outcome of a military conflict is attested to by the

¹E. L. Katzenbach, Jr., The Guerrilla and How to Fight Him (New York: Frederick A. Praeger Publishers, 1963), p. 12.

²Roland G. Ruppenthal, "Logistic Support of Armies," The U.S. Army in World War II: The European Theater of Operation (Washington, D.C.: Department of the Army, 1953), p. 583.

following statement by Japanese General Tojo, who, shortly before his death, told General Douglas MacArthur that one of the principal factors that defeated Japan was the ability of the United States carrier forces to operate for long times away from their home bases.¹

As pointed out in earlier chapters, the modern aircraft weapon system is one of the most complex pieces of equipment in history. These complex technical systems of today have had the effect "of reducing the capability of the combat forces for self-maintenance and increased the dependence upon the logistic organization."²

Charles Hitch, the great military strategist, points out that the national security of our country depends on a military force which has the capability to fight two separate types of wars: all-out thermonuclear war and limited local conflicts.³

Since "an all out thermonuclear war involving nations like the United States and the Soviet Union could easily destroy either or both in a matter of days or even hours,"⁴ the capability of this method of warfare is generally

¹RADM H. J. Foley, Jr., SC, USN, Commanding Officer, Aviation Supply Office, "The Supply Corps and Naval Aviation Support," Navy Supply Corps Newsletter, XXXIV, No. 2 (1971), 128.

²Henry E. Eccles, Logistics in the National Defense (Harrisburg, Pa.: The Military Service Publishing Company, 1959), p. 305.

³Hitch and McKean, Economics of Defense, p. 11.

⁴Ibid.

recognized as a deterrent from attack or possibly for use in retaliation after attack.¹ It is more likely that this nation's military forces will become involved in limited conflicts as a result of national political pressure or in fulfillment of its treaty obligations. As Maxwell Taylor stated:

The atomic retaliatory force has become the shield of protection warding off the threat of hostile atomic attack, while the forces of limited war provide the flexible sword for parry, reposte, and attack.²

Where the missile-carrying submarines are designed primarily for use in a thermonuclear war, the aircraft carrier is the major weapon system which the Commander-in-Chief relies on in the event of limited local conflicts. The main emphasis in modern naval strategy is on flexibility. In the naval forces, this flexibility is best represented by the Attack Aircraft Carrier and its embarked airwing of multipurpose aircraft.

One of the primary missions of the Naval Air Force is to provide superior power in any part of the world which the President feels requires it. To be capable of fulfilling this mission, it is required that the deployed ship and aircraft not only be in a state of operational readiness, but also that it be able to launch air strikes or combat the enemy immediately upon arrival at or enroute to the conflict area.

¹Ibid.

²Maxwell D. Taylor, The Uncertain Trumpet (New York: Harper and Row Brothers, Publishers, 1959), p. 64.

The seagoing task force commander of today not only is concerned with "beans, bullets and black-oil," but he must expand his logistics management to include the anticipation of numerous aircraft spares and bits and pieces needed to keep a technically complex array of machines in readiness.

Measurements of Readiness

The term "operational readiness" is universally defined as the degree of capability of a military unit to perform the mission assigned to it. This measurement is obtained by the evaluation of different standards depending upon the particular section of readiness being measured. A personnel manager would evaluate the quantity and quality of the personnel available against the predetermined standard, normally required to conduct the task. The readiness of an aircraft bomber squadron is measured by the number of aircraft combat-ready.¹

The measurement of fleet readiness from a logistical aspect is normally by the number of days' supplies of certain items on hand against a standard which is predetermined by the fleet commander.² This criterion provides a sufficient measurement for provisions, fuel, or common consumables, but it is comparable to no standard at all when measuring the

¹Hitch and McKean, Economics of Defense, p. 269.

²Henry E. Eccles, Operational Naval Logistics, NAVPERS 10869 (Washington, D.C.: U.S., Bureau of Naval Personnel, 1968), p. 11.

stocking level of repair parts, with their random demand pattern.

The measurement of readiness utilized for this type of material is based on a technique of measuring supply effectiveness in relation to issues of material to fulfill a customer's requirement. The motivating determinate would appear to be that if you can measure performance you can find ways to improve it and to measure the improvement.¹ This idea may stem from the lack of communication between operational commanders and supply personnel. Operational commanders have been prone to state their material requirement goals in terms of 100 per cent effectiveness. This type of objective is meaningless to the supplier, as the laws of probability, the budget, and, in fact, the nation's economy do not comprehend such a utopian objective. Supply goals should be definitive in that they may be understood, meaningful to all involved, and possible of achievement with respect to known constraints.

Measurement of supply effectiveness in the Navy is accomplished by a simple ratio of the total number of line items furnished to the requiring entity to the total number of line items demanded, expressed as a percentage. Two measures of supply effectiveness are made at each activity: (1) the Gross Material Availability Index and (2) the Net

¹Herbert E. Brose, The Criteria and System for Evaluating Logistics Effectiveness (Dayton: Wright-Patterson Air Force Base, 1959), p. 7.

Material Availability Index. The first is a measure of the supply point performance in furnishing every line item of standard stock required; this includes many items that are not stocked at the particular supply point. The second measure, the measure of net effectiveness, is a measure of the activity's performance in providing those line items that are authorized for stocking at that supply point. One difference between the Navy's method and most methods used in other services is that the Navy measures the stock point performance in supplying line items from stock on hand. No matter how rapidly a requirement is satisfied, it counts against the supply performance of the stock point if it is not supplied from stocks held at the time the request is processed. Mathematically, the Navy measures supply effectiveness as follows:

$$\text{Gross Material Availability Index} = \frac{\text{Total line items issued from stock} \times 100}{\text{Total gross line items requested}}$$

$$\text{Net Material Availability Index} = \frac{\text{Stocked line items issued from stock} \times 100}{\text{Total stocked line items requested}}$$

This measurement of effectiveness is an evaluation of an inventory manager's ability to maintain the stock he is allowed. However, in order to determine a more accurate evaluation of his performance, it is necessary to consider both the supply effectiveness and the time it takes him to obtain material from the system external to his activity.

Regardless of the supply effectiveness of a supporting activity such as an aircraft carrier, the true "criteria for measurement of the effectiveness of logistic support is mission readiness."¹ The most widely used measure of mission readiness is the aircraft NORS (Not-Operationally Ready-Supply) rate and the NFE² (Not Fully Equipped) rate.

The mathematical calculation for these rates is made as follows:

$$\text{NORS Rate} = \frac{\text{No. of aircraft grounded for lack of parts} \times 100}{\text{Total number of operational aircraft available}}$$

The problem arising from this measurement is that it is normally overstated, since many of the aircraft are flying their missions while still being classified as NORS. This is possible for the reason that the requirement for parts was not canceled when the defective item was repaired, or, as in many cases, cannibalization of the defective part from another grounded aircraft has been effected. Since the reporting custodian does not remove an aircraft from an NORS status until the required part or parts have been received by the supply officer and the maintenance department has been informed that the item is immediately ready for issue, an inflated figure results.

¹Brose, Evaluating Logistics Effectiveness, p. 5.

²A NFE measures aircraft which have not been rendered incapable of flight but which cannot carry out all aspects of their primary mission because of a parts shortage in support of equipment not essential to flight.

The use of the NORS or NFE rate as performance evaluation criteria sometimes results in the following disadvantages:

1. There is a tendency for some supply officers at base level to pay more attention to keeping the out-of-commission rates low than to getting the total job done properly.
2. Inefficient cannibalization of aircraft undergoing maintenance is sometimes used to establish a good base record.
3. The desire to establish a good record sometimes causes supply officers at the base level to "pack-rat" many items beyond their needs, increasing the repair parts inventory investment and causing shortages at other points in the supply system.

Effect of Proposed System on
Supply Effectiveness

What would be the effect on fleet readiness if the proposed criteria for funding and managing of aviation spares carried as inventory on board naval aircraft carriers were implemented?

Before this effect can be accurately and objectively evaluated, a short description of existing fleet readiness must be presented. From the viewpoint of one admiral connected with naval aviation, there has been "a gradual, yet serious decline in the general attitude toward weapon

system readiness, and a dangerous loss of that compelling determination to keep our powder dry, and in proper supply!"¹

Admiral Yates presented specific examples of the above statement:

In order to meet minimum flying hour requirements, the pilots gradually begin to accept less and less quality. Standards were lowered accordingly, and further demoralization precipitated a vicious downward spiral of combat readiness. Frequently, at the end of a day's flying, the USS John F. Kennedy (CVA-67) could not launch a single "all up" fighter plane in the defense of the Sixth Fleet.²

He further stated that "upon investigation, I found that indeed, the logistics support, both on the local and navy-wide level, was unsat."³

This senior naval officer feels that "the combination of buying before flying, unsophisticated provisioning, poor planning for fleet introduction, and lack of a comprehensive and formalized system for improvement, have seriously reduced our combat effectiveness and skyrocketed the price."⁴ Admiral Yates' opinion of the readiness condition of our aircraft carriers is substantiated by the Force Supply Officer, Commander Naval Air Forces, Atlantic Fleet, who feels that "the NORS and NFE rate in the Sixth Fleet has continued to worsen for three straight years."⁵

¹RADM E. P. Yates, USN, Commander, Fleet Air, Whidbey, in a speech to the 25th Aviation Supply Officers' Conference, Philadelphia, Pennsylvania, October 20, 1970.

²Ibid.

³Ibid.

⁴Ibid.

⁵Grinstead, Presentation, on October 21, 1970.

As can be determined from the statements and substantiation of the above personnel, the fleet readiness is in need of improvement at the present time. It would appear that the present system of managing afloat inventories has proved inadequate, despite the extensive range and depth stocked in the Aviation Consolidated Allowance List (AVCAL) inventory, at an enormous cost.

This writer feels that the proposed system would improve fleet readiness through improved stocking in both range and depth of the items which are experiencing usage navy-wide, as substantiated by the 3M maintenance data and the demand history information available within the records of the Aviation Supply Office. In addition, the deletion of the procurement requirement for the enormous quantity of excess material now indicated by the Initial Outfitting Lists (IOL) would allow increased management and funding of high-usage material.

In cases where the supporting ship lacks the operation and maintenance funds to procure the full range and depth under the present system, the stock fund system would be capable of stocking the required material in a readiness status without tying up the operator's "in-use" funds. If the system manager felt that it was necessary to stock certain "insurance" items despite the lack of usage data, these relatively few items of stock could be exempted from the stock turn/sales criteria because of their military essentiality (ME) characteristics.

When fleet readiness is measured on the basis of supply effectiveness, as defined earlier, there should be minimal reduction in effectiveness due to the inventory reduction resulting from the implementation of the Navy Stock Fund inventory management system on board aircraft carriers. The reasoning behind this opinion is that if no demands are being placed for the excess material stocked, as verified by the studies discussed in the previous chapter on stocking objectives, there can be no loss of supply effectiveness.

This theory is substantiated by a short review of the supply effectiveness rate before and after the recent (1964) implementation of the Fleet Logistics Support Improvement Program (FLSIP) to shipboard spare parts inventories.¹ Basically, this program utilizes 3M maintenance data for determining the range and depth of ships' repair parts to be carried in the afloat inventory. This system has had the effect of "reducing the range and depth of allowed repair parts in support of fleet units without decreasing readiness."²

The reduction in number of repair parts carried under FLSIP is the result of carrying only those insurance items that are vital to the support of the equipment that is essential to the primary mission of the ship, or to the

¹CDR T. A. Biddison, SC, USN, "Your Equipment Support Allowance," Navy Supply Corps Newsletter, XXXII, No. 10 (1969), 28-31.

²Ibid., p. 31.

crew's safety or welfare, and those that have a 15 per cent or greater probability of usage aboard ship in a one-year period.¹ In addition to these "insurance" items, only those "demand-based" items (those items which experience one or more shipboard demand during a ninety-day period) are stocked which will provide a minimum of 90 per cent probability of filling the total combat demands for these items over the entire ninety-day operating period, or, conversely, no more than a 10 per cent risk of stock-out is acceptable.²

The results of this implementation are extremely enlightening. Out of a total of 389,000 federal stock numbers reviewed, the quantities on 210,060 (54 per cent) were reduced or deleted, 23,340 (6 per cent) were increased, and 155,600 (40 per cent) remained the same as the previous rate. When 1,827,967 demands by 900 ships were analyzed, a total of 287,981 of them were "not carried."³ This resulted in a supply effectiveness rate of:

$$\text{supply effectiveness rate} = \frac{\text{total No. of issues (1,539,986)}}{\text{total No. of demands (1,827,967)}} = 84.3\%$$

This rate compares favorably with the "pre-FLSIP" effectiveness rates of 80.1 and 84.4 per cent.⁴ The 287,981 "not

¹Personal interview with J. Gumenick, Technical Assistant, Weapons System Support Division, Naval Supply Systems Command, Washington, D.C., March 16, 1972.

²Ibid.

³Ibid.

⁴Ibid.

carried" demands consisted of 191,016 federal stock numbers of which 91.7 per cent were demanded two times or less by the entire active fleet over a one-year period.¹

These data significantly reinforce the assumption that the demand for spare parts aboard ship is highly random and that, within any reasonable dollar constraints, it would be difficult to exceed the middle-to-upper 80 percentile range with regard to supply effectiveness. This writer submits that this assumption is valid for aircraft spare parts as well.

Summary

This chapter has pointed out the importance of the logistics aspect in regard to operational readiness. Various methods of measuring operational readiness were described and evaluated.

The negative effect, if any, that would accrue to fleet readiness as a result of implementation of the Navy Stock Fund inventory management system was discussed and evaluated.

On the basis of the present state of fleet readiness and the positive results of the recently implemented Fleet Logistics Support Improvement Program for determining ship-board spare parts, this writer has drawn the conclusion that any effect on the operational readiness of naval aircraft carriers would be minimal.

¹Ibid.

CHAPTER VII

SUMMARY AND CONCLUSIONS

Summary

It has been the purpose of this paper to investigate the feasibility of implementing the present Navy Stock Fund inventory management and accounting system on board Naval aircraft carriers in a manner which will allow efficient, economical management without degradation of the operational readiness of fleet units.

The technique of utilizing the stock funding system for the management of inventories is neither new or unique in supply management; nor is it a panacea for the multitude of problems which confront the afloat inventory manager. The stock funding procedure does, however, provide a control mechanism for evaluation of the manager, as well as for meeting the morale and motivational needs of the manager through the use of participative management.

It has been demonstrated that the Navy Stock Fund has proved to be an efficient and effective tool for almost eighty years in the management of military inventories. Since the establishment of the Navy Supply Fund in 1893, this method of inventory management has allowed the Navy and the

Congress to control and provide for the economical logistics support of our weapon systems, both in peacetime and during periods of conflict.

As a result of recognition by the Hoover Commission of the advantages of the Navy's system, the National Security Act of 1947 provided the Secretary of Defense with the authority for, and encouraged the use of, stock funds within the military services. This method of management provided a means for more effective control and accountability of program costs within the Department of Defense.

The Navy Stock Fund concept was explained and evaluated with regard to the advantages and disadvantages to be accrued from its utilization in the management of inventories. An evaluation was made of the effect of this concept on the utilization of financial, material, and personnel resources that this system would generate if implemented as a management tool for Navy aircraft carrier inventories.

For a better evaluation of the advantages of the Navy Stock Fund concept as compared with the present system, the major problems of aeronautical support confronting the inventory manager were discussed and analyzed. These major problems concern excess stocks and low availability resulting from erroneous provisioning, poor personnel morale and lack of motivational factors for the managers of the present system, and the decreasing operational readiness of fleet units.

Within this paper an effort was made to show how the Navy Stock Fund inventory management system would eliminate or reduce these problems while providing for increased benefits at lower costs.

Conclusions

It is the conclusion of this writer that the application of the Navy Stock Fund inventory and accounting management system to the shipboard spare parts inventories on board Naval aircraft carriers is feasible. The implementation of this method of management would provide for a level of fleet readiness that is equivalent or superior to that presently existing, and at a substantially reduced cost not only to the operating commander but to the total aviation logistics system as well.

This conclusion is based upon the following reasons:

1. Stock Fund financing of carrier inventories would preclude the loss of operating funds presently incurred because of the return of material to the system without credit. As this material would be owned by the Stock Fund, there would be no loss of operating funds.

2. The utilization of stock fund financing for afloat aeronautical inventories would provide more flexibility in the acquisition of inventories than is now possible under operational funding. Critical shortages of operational funds would not prevent the inventory manager from procuring and

stocking material which would be consumed at a later date.

3. The sales/demand criteria for determining stock level would prevent the inventory manager from stocking an excess quantity of "non-moving" stock.

4. The management incentives resulting from participative management and reduced stock levels would result in improved utilization of personnel and physical resources.

5. Fleet readiness would not be degraded as a result of reduced stock levels under the proposed concept, as the material removed from inventories has an extremely high probability of not being required. There is a strong possibility that fleet readiness may improve because of the capability of stocking required items in increased depth with funds generated by reduced stocking.

In summary, it is the conclusion of this writer that the continuing squeeze between the incredible rise in weapon system costs¹ and the decreasing share of the nation's Gross National Product (GNP) allocated to the Defense budget² will force the weapons managers to reduce their supporting inventories to a more realistic level of required material, with fewer "insurance" items.

¹"Stopping the Incredible Rise in Weapons Costs," Business Week, February 19, 1972, p. 60.

²U.S., Department of Defense, Department of Defense Budget for Fiscal Year 1973 (Washington, D.C.: Government Printing Office, January, 1972).

When this time comes, predictably within the next few years, the carrier supply officer will find that the Navy Stock Fund Inventory and Accounting Management System provides (in theory, if not in the "real world") the tools with which to achieve these objectives.

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